

# Symmetra PX 100 kW 208 V

**Optional Modular PDU  
(600:208 V, 480:208 V,  
208:208 V, 208 V Transformerless)**

## Installation





# Table of Contents

<b>IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS</b> .....	1
<b>Specifications</b> .....	2
<b>Specifications for Installations without PDU</b> .....	2
AC Input.....	2
AC Output.....	2
Recommended Current Rating of Feeder Circuit Breakers.....	3
Recommended Conductor Sizes per Phase/Neutral.....	3
Recommended Bolt and Lug Sizes.....	4
Full Load Heat Loss at Nominal Mains.....	4
<b>Specifications for Installations with PDU</b> .....	4
AC Input.....	4
AC Output.....	5
PDU Subfeed Circuit breaker Trip Currents Merlin Gerin NSJ400 - STR23SP	
Electronic Trip Unit <sup>1</sup> .....	5
Recommended Current Rating of Input Circuit Breaker.....	5
Inrush Currents.....	5
Recommended Conductor Sizes.....	6
Full Load Heat Loss at Nominal Mains.....	7
<b>Batteries</b> .....	7
<b>Installation Procedure</b> .....	8
<b>Installations without PDU</b> .....	8
<b>Installations with PDU with Transformer</b> .....	9
Single Utility System.....	9
Dual Utility System.....	10
<b>Installations with PDU without Transformer</b> .....	11
Single Utility System.....	11
Dual Utility System.....	12
<b>Mechanical Assembly</b> .....	13
<b>Re-arrange the Side Panels</b> .....	13
<b>Remove the Side Panels</b> .....	13
<b>Install the Side Panels</b> .....	14
<b>Install the Internal Conductors for Bottom Entry Systems in Installations with PDU without Transformer</b> .....	14
<b>Perform Equipotential Bonding</b> .....	15
<b>Interconnect and Level the Enclosures</b> .....	15

<b>Prepare for Cables .....</b>	<b>17</b>
<b>Installations without PDU .....</b>	<b>17</b>
Top Cable Entry .....	18
Bottom Cable Entry .....	18
<b>Installations with PDU with Transformer .....</b>	<b>19</b>
Top Cable Entry .....	20
Bottom Cable Entry .....	21
<b>Installations with PDU without Transformer .....</b>	<b>22</b>
Top Cable Entry .....	23
Bottom Cable Entry .....	24
<b>Power Cables .....</b>	<b>26</b>
<b>Connect Power Conductors in Installations without PDU .....</b>	<b>27</b>
<b>Connect Power Conductors in Installations with PDU with Transformer .....</b>	<b>28</b>
<b>Connect Power Conductors in Installations with PDU without Transformer — Top Cable Entry .....</b>	<b>30</b>
<b>Connect Power Conductors in Installations with PDU without Transformer — Bottom Cable Entry .....</b>	<b>31</b>
<b>Connect Power Conductors between the UPS and the PDU (Applicable to all Systems with PDU) .....</b>	<b>32</b>
Connect Output Cables to the Subfeed Breaker .....	33
Install and Connect Output Cables to the Power Distribution Module .....	34
<b>Battery Cables .....</b>	<b>35</b>
<b>Install the APC Battery Solution .....</b>	<b>35</b>
Connect the Battery Cables between the XR Battery Enclosures .....	35
Connect the Battery Cables to the UPS .....	37
<b>Emergency Power Off (EPO) Switch .....</b>	<b>39</b>
EPO switch wiring diagram .....	40
<b>Communication Wires .....</b>	<b>41</b>
Connect Network Communication Wire .....	41
Connect Communication Wires in Installations without PDU .....	42
Maintenance Bypass Panel Interface .....	43
Connect Communication Wires in Installations with PDU .....	44
<b>Install Seismic Option .....</b>	<b>45</b>
Replace the Side Panel Lock .....	45
Install the Rear Anchoring Brackets .....	48



<b>Install the Front Anchoring Bracket.....</b>	<b>49</b>
<b>Install the Top Assembly Bracket .....</b>	<b>49</b>
<b>Install the Door Hinge Lock.....</b>	<b>50</b>
<b>Install the Battery Locks .....</b>	<b>51</b>



# IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS

---



**WARNING:** ALL safety instructions in the Safety sheet (990-2984) must be read, understood, and followed when installing the UPS system. Failure to do so could result in equipment damage, serious injury, or death.



**WARNING:** The UPS system does not have built-in disconnection devices for AC input/output and DC input. The customer must provide AC input/output over-current protection and an AC output disconnect device.



**WARNING:** After the UPS has been electrically wired, do not start it. Start-up is commissioned to APC-authorized personnel only.



**WARNING:** The Sidecar (model PDPM100SC) is required for underfloor wiring into the PDU when the PDU contains a transformer. The Sidecar does not contain a switch or circuit breaker, so a readily accessible disconnect device shall be incorporated external to the equipment.



**WARNING:** For remote XR Battery Enclosures, the length of the signal and power cables must not exceed 200 m, on the cable that connects the XR Battery Enclosure to the UPS. For power cables between 50 and 200 m, the voltage drop must be taken into account when the cable size is chosen. All electrical power and power control wiring must be installed by a qualified electrician, and must comply with local and national regulations for maximum power rating.

# Specifications



**Caution:** All electrical power and power control wiring must be installed by a qualified electrician, and must comply with local and national regulations for maximum power rating.



**Note:** All current values are based on a 100 kW maximum configuration of the UPS.

## Specifications for Installations without PDU

### AC Input

	208 V UPS only
Connection type, single feed	4-wire (3PH + N + G)
Connection type, dual feed	Mains input: 3 wire (3PH+G), Bypass Mains input: 4-wire (3PH + N + G)
Nom. input frequency (Hz) <sup>1</sup>	60
Nom. input current (A) <sup>2</sup>	302
Max. input current (A) <sup>3</sup>	332
Input current limit (A) <sup>4</sup>	360
Nom. bypass input current (A)	278
Maximum available fault current (kA) <sup>5</sup>	30
<sup>1</sup> Input frequency (Hz) 40-70 with 10Hz/sec slewrate. <sup>2</sup> Input current based on nominal voltage and rated load, batteries fully charged. <sup>3</sup> Input current based on full battery recharge, nominal voltage and rated load. <sup>4</sup> Current limitation through electronic current limiting is based on full rated load and limited battery recharge from -10% to -15% input voltage. <sup>5</sup> The maximum available fault current was not evaluated by Underwriters Laboratories.	

### AC Output

	208 V UPS only
Connection type	4-wire (3PH+ N + G) or 3 wire (3PH+G)
Nominal output current (A)	278

## Recommended Current Rating of Feeder Circuit Breakers



**Caution:** To reduce the risk of fire, connect only to a circuit provided with (see below) amperes maximum branch circuit overcurrent protection in accordance with the National Electric Code, NSI/NFPA 70.

	<b>208 V UPS only</b>	
	<b>Standard rated (80%)</b>	<b>100% rated</b>
Mains input (A)	450	400
Bypass input (A)	450	400
Battery (A)	300	300
Output (A)	350	300

## Recommended Conductor Sizes per Phase/Neutral



**Caution:** All wiring must comply with all applicable national and/or local electrical codes.

Conductor sizing in this manual is based on Table 310-16 of the National Electrical Code (NEC) with the following assertions.

- 90°C conductors (THHN) for 75°C termination
- 3 current carrying cable
- An ambient temperature of 30°C
- Use only copper conductors

If the ambient room temperature is greater than 30°C, larger conductors are to be selected in accordance with the correction factors of the NEC.

Equipment Grounding Conductors (EGC) are sized in accordance with NEC Article 250-122 and Table 250-122.

Grounding Electrode Conductors (GEC) are sized in accordance with NEC Article 250-66 and Table 250-66.

The conductor sizes are recommendations for maximum configurations. Even if the load is less than the maximum rating, it is wise to plan for future load increases. If the system is operated at a lower load than its rating and it is desired to supply the system with a lower rated breaker and smaller conductors, conductor ampacities are to be selected in accordance with the NEC.

	<b>208 V UPS only</b>	
	<b>Standard rated (80%)</b>	<b>100% rated</b>
Mains input	2 x 4/0 AWG	500 kcmil
Bypass input	2 x 4/0 AWG	500 kcmil
Battery	300 kcmil	300 kcmil
Output	500 kcmil	300 kcmil
Equipment Grounding Conductor	3 AWG	3 AWG

## Recommended Bolt and Lug Sizes

Cable	Terminal Bolt Diameter	Cable Lug Type		Crimping tool CT-720 Crimping Die:	
		80% rated	100% rated	80% rated	100% rated
Mains input	M10	LCA4/0-12H-X	LCA500-12H-6	CD-720-3	CD-720-7
Bypass input	M10	LCA4/0-12H-X	LCA500-12H-6	CD-720-3	CD-720-7
Battery 1	M10	LCA300-12H-X	LCA300-12H-X	CD-720-4	CD-720-4
Battery 2	M10	LCA300-12H-X	LCA300-12H-X	CD-720-4	CD-720-4
Output	M10	LCA500-12H-X	LCA300-12H-X	CD-720-7	CD-720-4

## Full Load Heat Loss at Nominal Mains

Full load heat loss at nominal mains: 8.1 kW (27656.8 Btu)



**WARNING:** This is a Class A UPS product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

## Specifications for Installations with PDU

### AC Input

	208 V : 208 V	480 V : 208 V	600 V : 208 V	No transformer
Connection type	3PH+ G+GEC			3PH+ N+G
Nom. input frequency (Hz)	57-63			40-70
Nom. input current (A) <sup>1</sup>	307	133	106	302
Max. input current (A) <sup>2</sup>	337	146	117	332
Input current limit (A) <sup>3</sup>	366	165	127	360
Nom. bypass input current (A)	282	122	98	278
Maximum available fault current (kA) <sup>4</sup>	65	65	25	30

<sup>1</sup> Input current based on nominal voltage and rated load, batteries fully charged

<sup>2</sup> Input current based on full battery recharge, nominal voltage and rated load

<sup>3</sup> Current limitation through electronic current limiting is based on full rated load and limited battery recharge from -10% to -15% input voltage.

<sup>4</sup> The maximum available fault current was not evaluated by Underwriters Laboratories.

## AC Output

	208 V : 208 V	480 V : 208 V	600 V : 208 V	No transformer
Connection type	4-wire (3PH + N + G) or 3 wire (3PH+G)			
Output voltage	3 x 208/120 V			
Nominal output current (A)	278	278	278	278
Power Distribution Modules (A) (not included)	20 A, 30 A, 40 A, 50 A, 60 A			
Subfeed	278 A maximum (included) see following table			

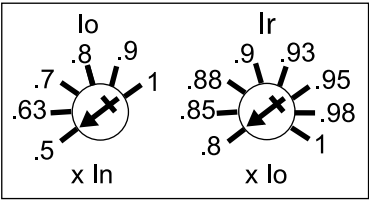
## PDU Subfeed Circuit breaker Trip Currents Merlin Gerin NSJ400 - STR23SP Electronic Trip Unit<sup>1</sup>

Io Setting	Ir Setting							
	1	0.98	0.95	0.93	0.90	0.88	0.85	0.8
0.9								288
0.8				297.6 <sup>3</sup>	288	281.6	272	256
0.7	280	274.4	266	260.4	252	246.4	238	224
0.63	252	247	239.4	234.4	226.8	221.8	214.2	201.6
0.5	200	196	190	186	180	176	170	160

<sup>1</sup> 400 A frame, 100% rated @400 A

<sup>2</sup> Long-time (LT) overload protection =  $I_n \times I_o \times I_r$ - Example:  $400 \times 0.5 \times 0.8=160$  A. See NEC-2008 Art. 240.6 (C) for additional information.

<sup>3</sup> Factory default:  $400 \times 0.93 \times 0.8 = 297.6$  A or ~ 300 A. The maximum Subfeed Output Loading must not be greater than 278 A/phase.



## Recommended Current Rating of Input Circuit Breaker

	208 V : 208 V	480 V : 208 V	600 V : 208 V	No transformer
	Standard rated*			
Mains input (A)	500	225	175	450

\* Standard circuit breakers are rated to carry 80% of their current rating continuously.

## Inrush Currents

The supply overcurrent protective device must be able to handle the below transformer inrush currents.

	208 V : 208 V	480 V : 208 V	600 V : 208 V
Inrush current (A)	4500	2000	1500

## Recommended Conductor Sizes



**Caution:** All wiring must comply with all applicable national and/or local electrical codes.

Conductor sizing in this manual is based on Table 310-16 of the 2008 National Electrical Code (NEC) with the following assertions:

- 90°C conductors (THHN) for 75°C termination
- 3 Current Carrying Conductors
- An ambient temperature of 30°C

If the ambient room temperature is greater than 30°C, larger conductors are to be selected in accordance with the correction factors of the NEC.

Equipment Grounding Conductors (EGC) are sized in accordance with NEC Article 250-122 and Table 250-122.

Grounding Electrode Conductors (GEC) are sized in accordance with NEC Article 250-66 and Table 250-66.

The conductor sizes are recommendations for maximum configurations. Even if the load is less than the maximum rating, it is wise to plan for future load increases. If the system is operated at a lower load than its rating and it is desired to supply the system with a lower rated breaker and smaller conductors, conductor ampacities are to be selected in accordance with the NEC. The transformer inrush must be taken into account when sizing conductors.

		208 V : 208 V	480 V : 208 V	600 V : 208 V	No transformer
Mains input Ø and N	Cu	(2) 4/0	4/0	2/0	(2) 4/0
	Al	(2) 300 kcmil	300 kcmil	4/0	(2) 300 kcmil
Grounding Electrode Conductor (GEC)	Cu	2 AWG			
	Al	1/0			
Equipment Grounding Conductor (EGC)	Cu	2 AWG	4 AWG	6 AWG	2 AWG
	Al	1/0	2 AWG	4 AWG	1/0
Output	Supplied with Power Distribution Modules				
Subfeed output	Cu	(2) 2/0 Ø and N, 4 AWG EGC, GEC not required			
	Al	(2) 4/0 Ø and N, 2 AWG EGC, GEC not required			
Ø = phase					
N = neutral					
(2) = two conductors per phase and neutral (when neutral is required)					
Subfeed is required to have two conductors per phase & N for full output due to limited wire bend space.					
The No transformer PDU requires a Neutral & does not require GEC.					
Cu = Copper conductors, Al = Aluminum conductors					



## Full Load Heat Loss at Nominal Mains



**WARNING:** This is a Class A UPS product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

	208 V : 208 V	480 V : 208 V	600 V : 208 V	No transformer
Full load heat loss (kW )	3.2	3.1	2.6	1.5
BTU/hour	10,919	10,578	8,872	5,118

## Batteries

Battery Input	
Nom. voltage (VDC)	2 x 192
I <sub>Nom</sub> discharge <sup>1</sup>	282
I <sub>Max</sub> discharge <sup>2</sup>	351
Minimum discharge voltage	1.6-1.75 V/cell (automatic, depending on load)
<sup>1</sup> Nominal battery discharge current based on rated load and nominal battery voltage (2.0 V/cell)	
<sup>2</sup> Maximum battery discharge current based on rated load at the end of the discharge (1.6 V/cell)	

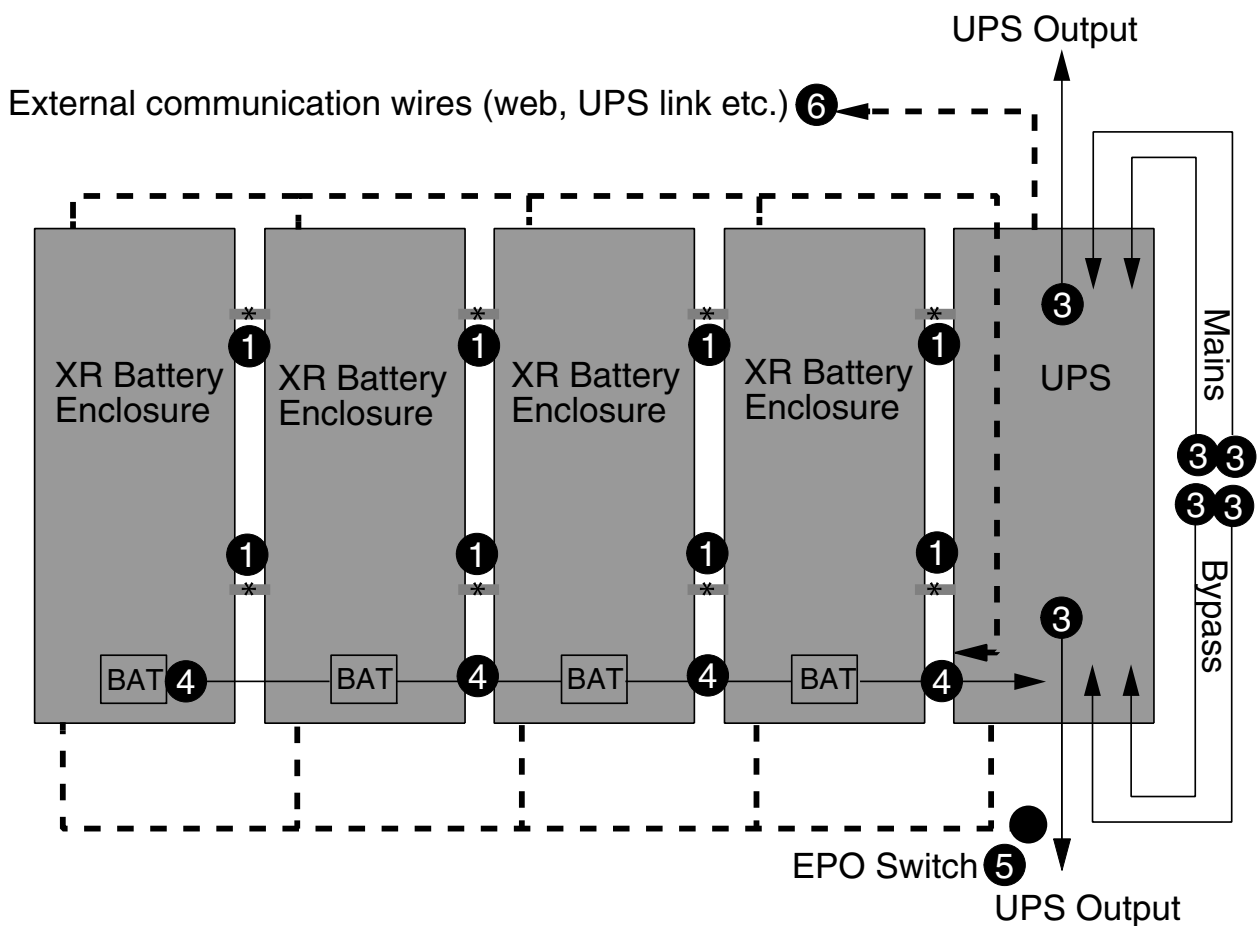
# Installation Procedure



**Note:** Only systems installed on a raised floor must use bottom cable entry.

1. Mechanical assembly.
2. Prepare for cables (not shown).
3. Connect power cables.
4. Connect battery cables.
5. Connect the Emergency Power Off (EPO) Switch.
6. Connect communication wires.

## Installations without PDU



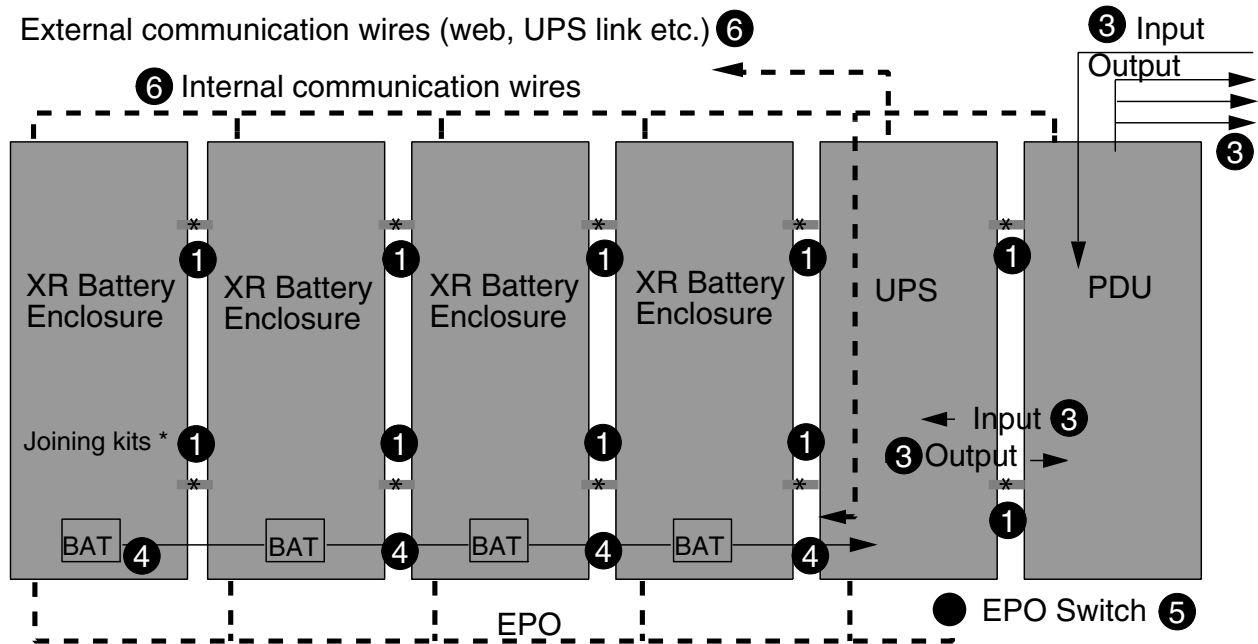
# Installations with PDU with Transformer



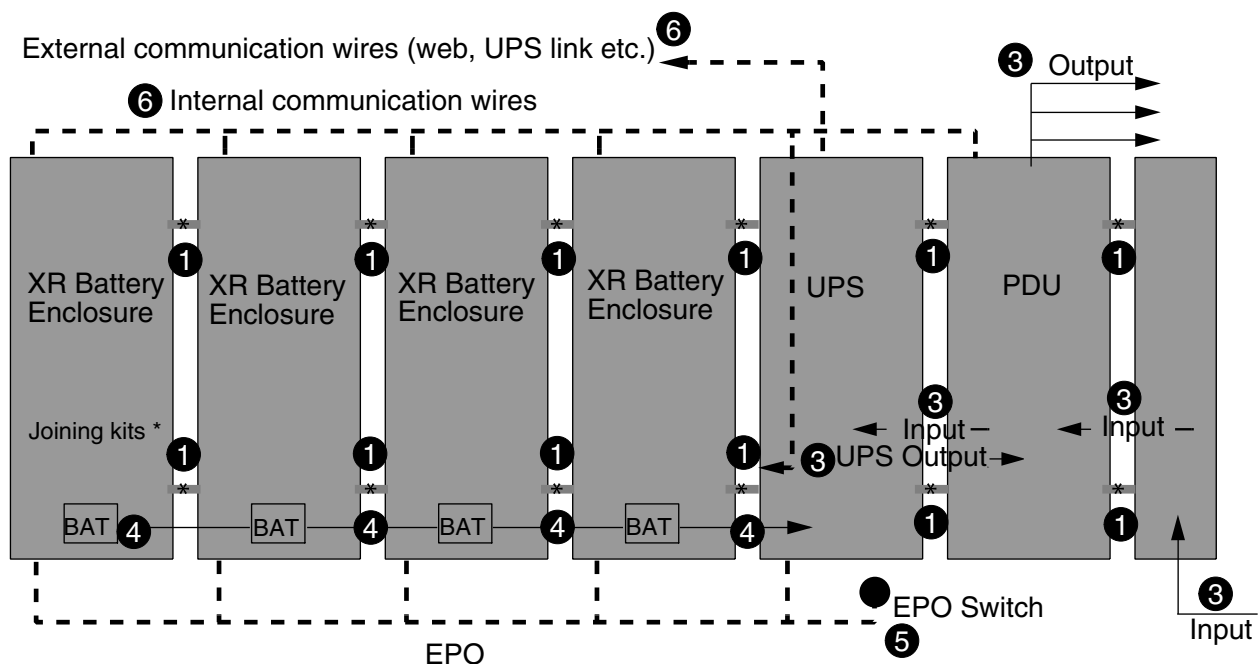
**Note:** For bottom cable entry systems, make sure to follow “*Install the Internal Conductors for Bottom Entry Systems in Installations with PDU without Transformer*” before proceeding to “*Perform Equipotential Bonding*”.

## Single Utility System

### Top Cable Entry System

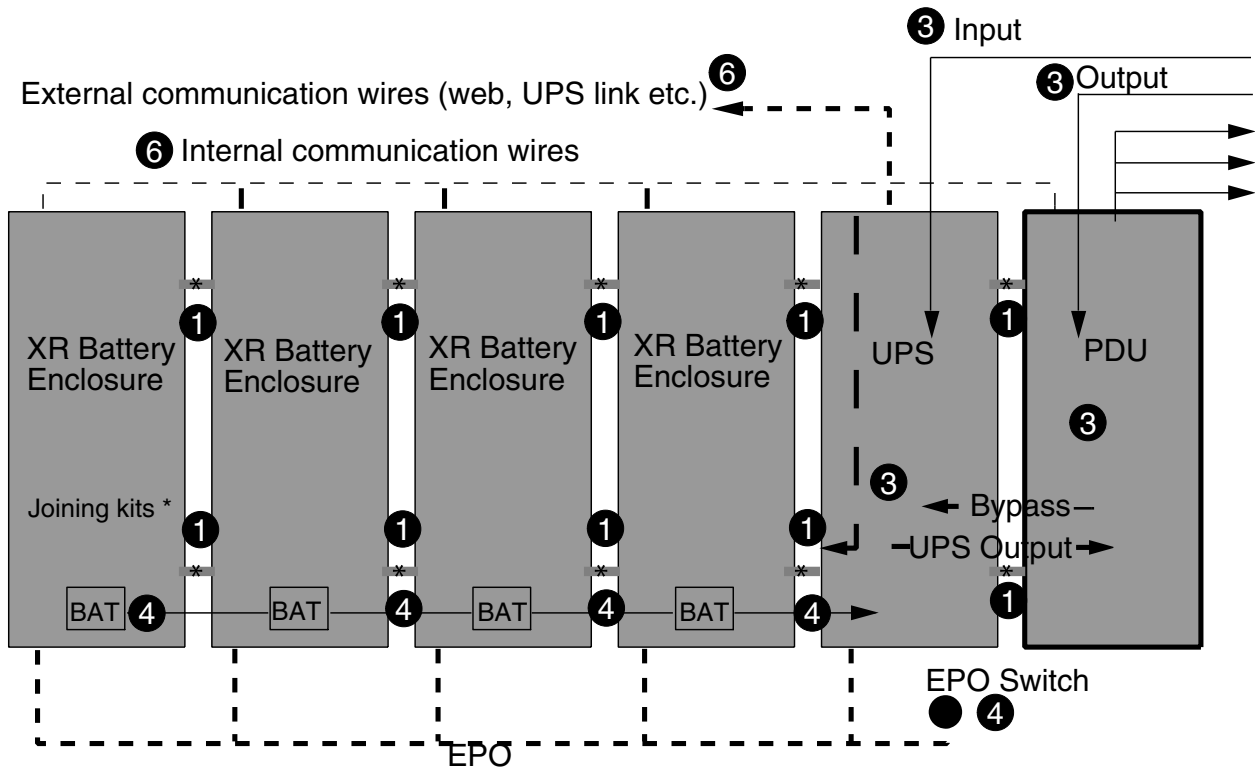


### Bottom Cable Entry System

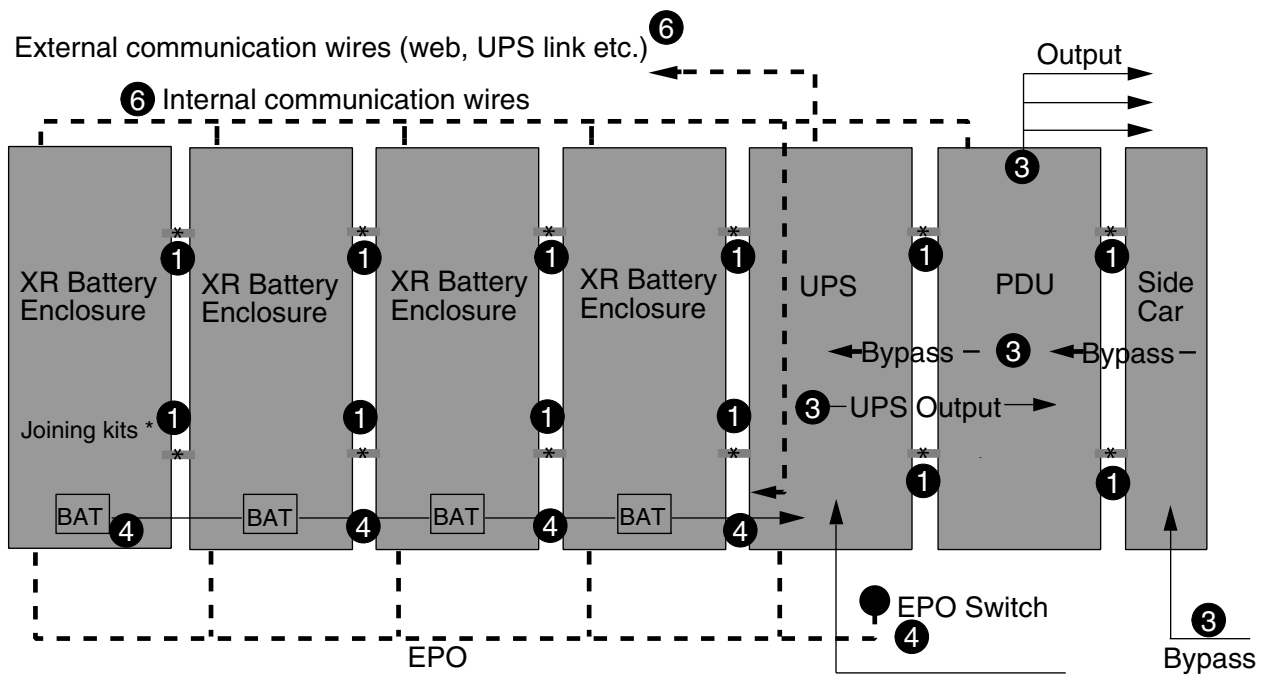


## Dual Utility System

### Top Cable Entry System



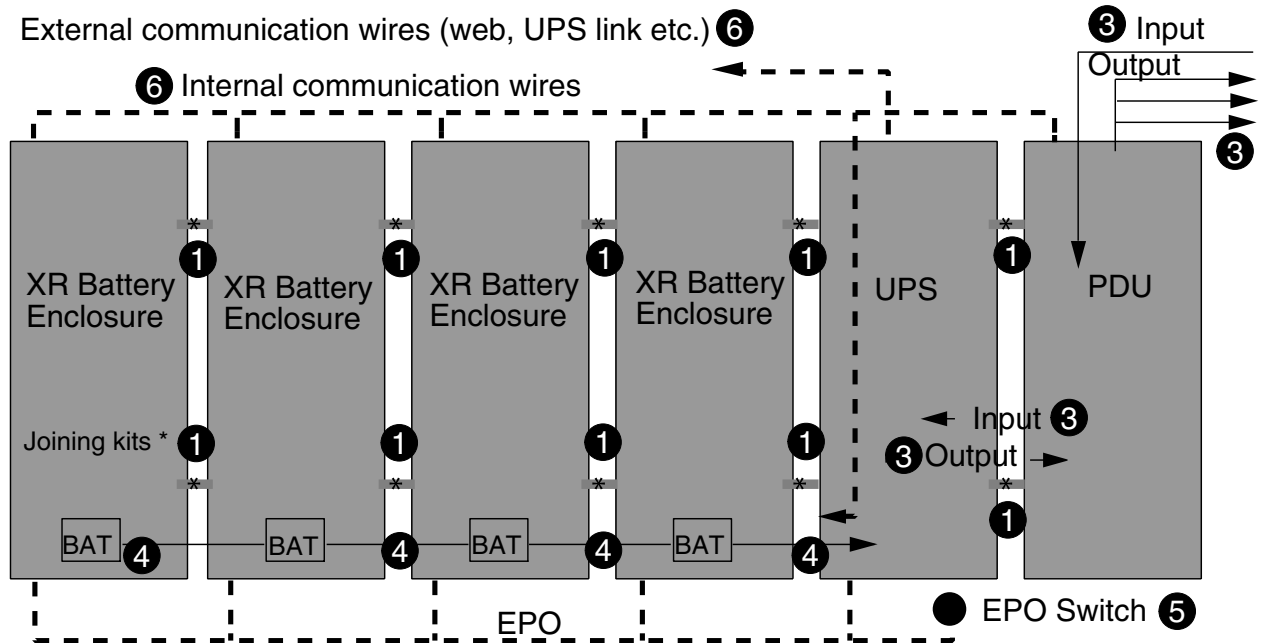
### Bottom Cable Entry System



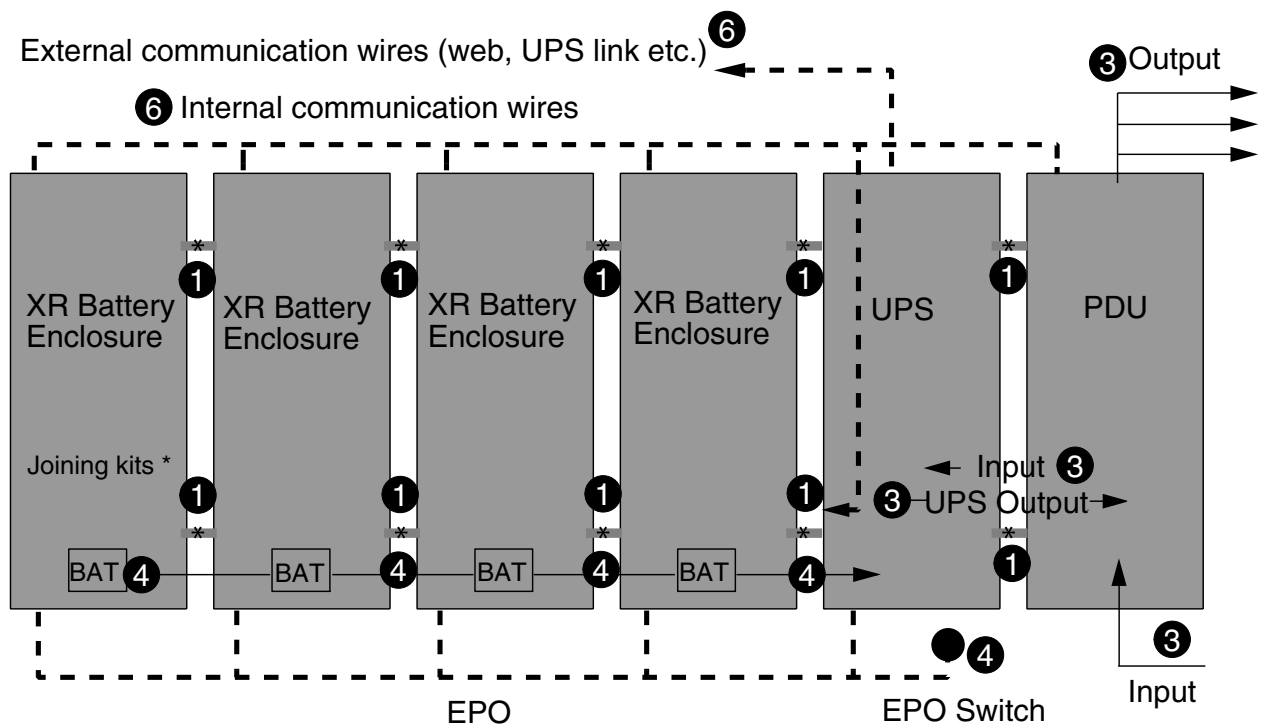
# Installations with PDU without Transformer

## Single Utility System

### Top Cable Entry System

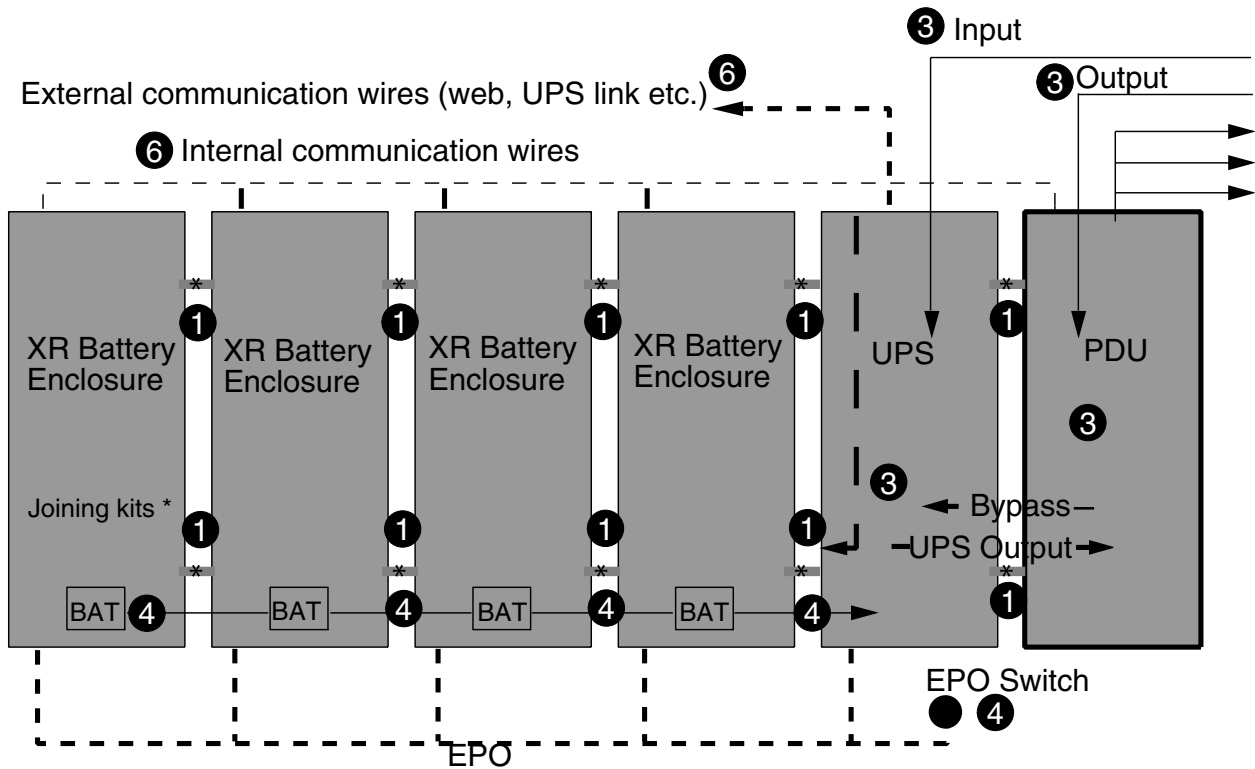


### Bottom Cable Entry System

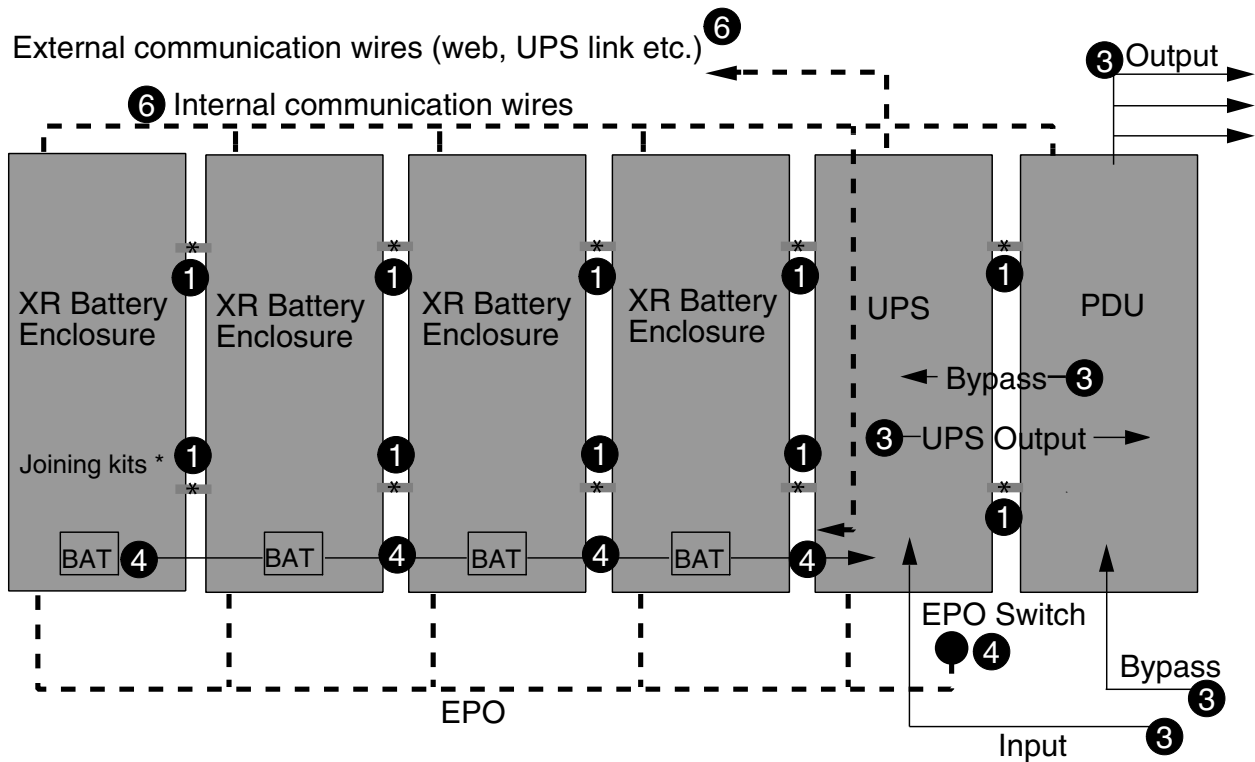


## Dual Utility System

### Top Cable Entry System



### Bottom Cable Entry System



# Mechanical Assembly

---

## Re-arrange the Side Panels



**WARNING:** For safety reasons, the UPS side panels must always be installed on the right side of the PDU even though it is placed up against the UPS.



**Note:** The type of installation determines the need to re-arrange the side panels. The side panels are installed on the UPS and should be moved to the end of row enclosures.

## Remove the Side Panels

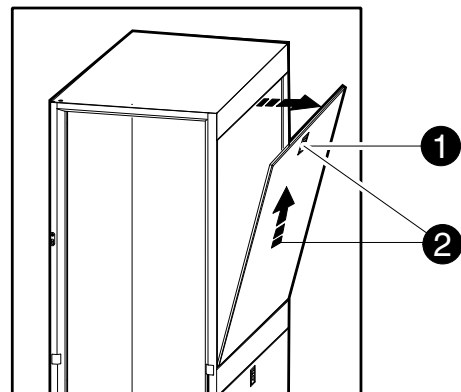


**WARNING:** The side panels must be locked with the red key to avoid unintended access to live parts.



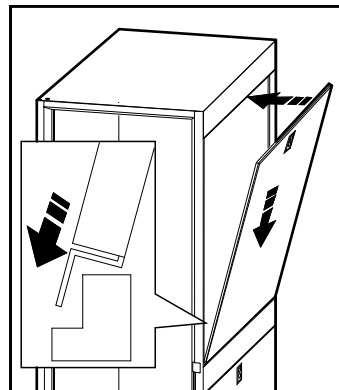
**WARNING:** Ensure that all bonding clips are in place on the lower edge on the side panel.

1. Unlock the side panels with the red key (provided).
2. Press down on the lock and then pull out and up.

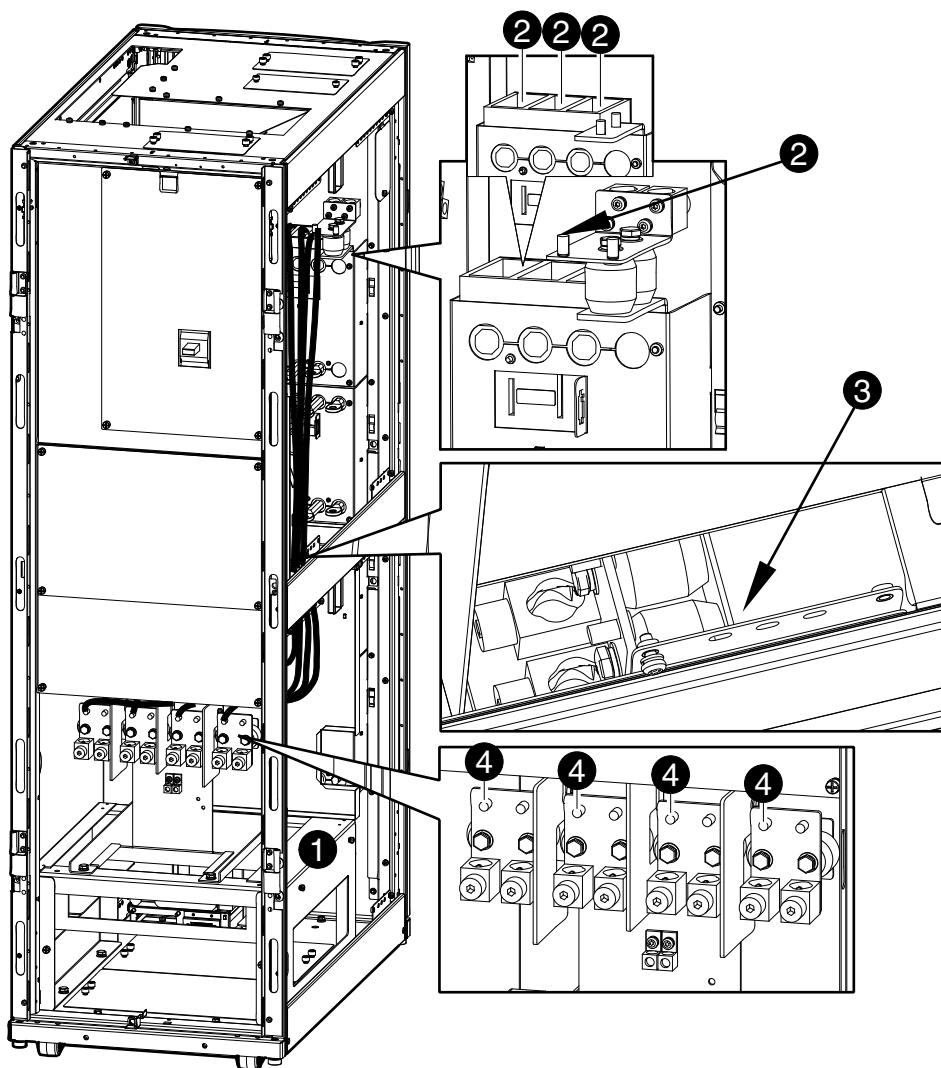


## Install the Side Panels

1. Set the base of the panel at an angle and push the panel in.
2. Lock the side panels with the red key.



## Install the Internal Conductors for Bottom Entry Systems in Installations with PDU without Transformer



1. Remove the sidepanel from the PDU.
2. Connect the N, L1, L2, L3 conductors (supplied in the bottom of the enclosure) to the input terminals.
3. Route the cables to the bottom terminal, through the hole in the right side.



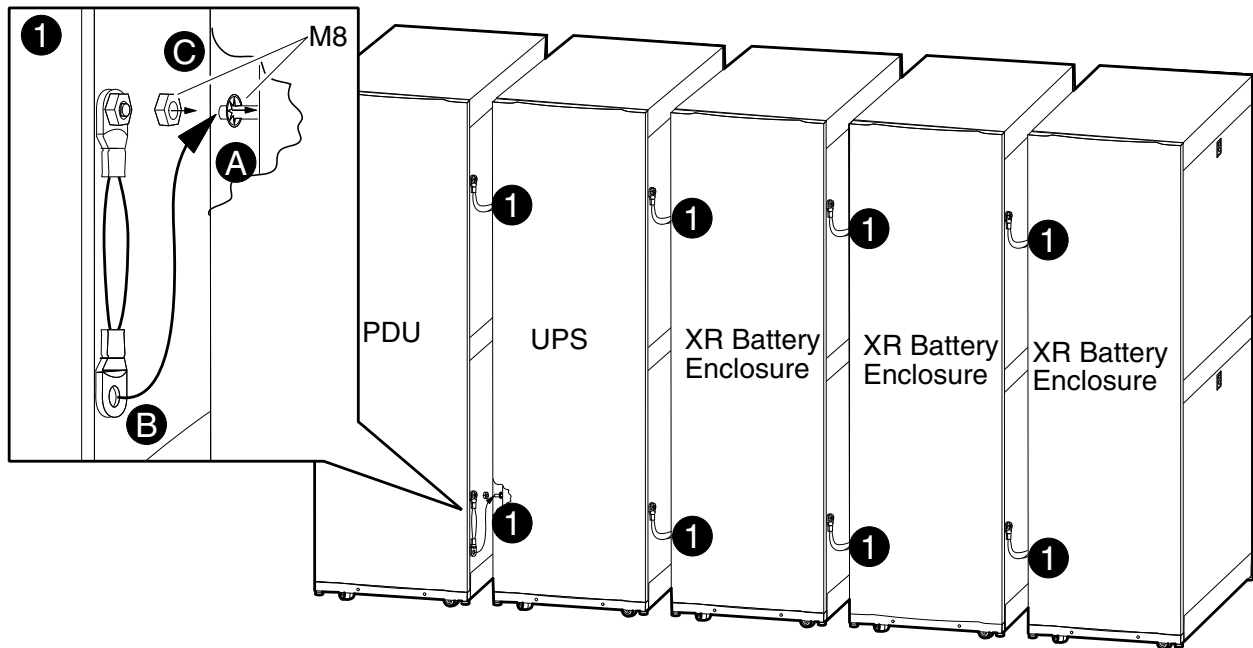
4. Connect the N, L1, L2, L3 conductors to the bottom terminals.

## Perform Equipotential Bonding



**Note:** It might be necessary to move some of the equipotential bonding wires to fit your system configuration.

### Rear of the System



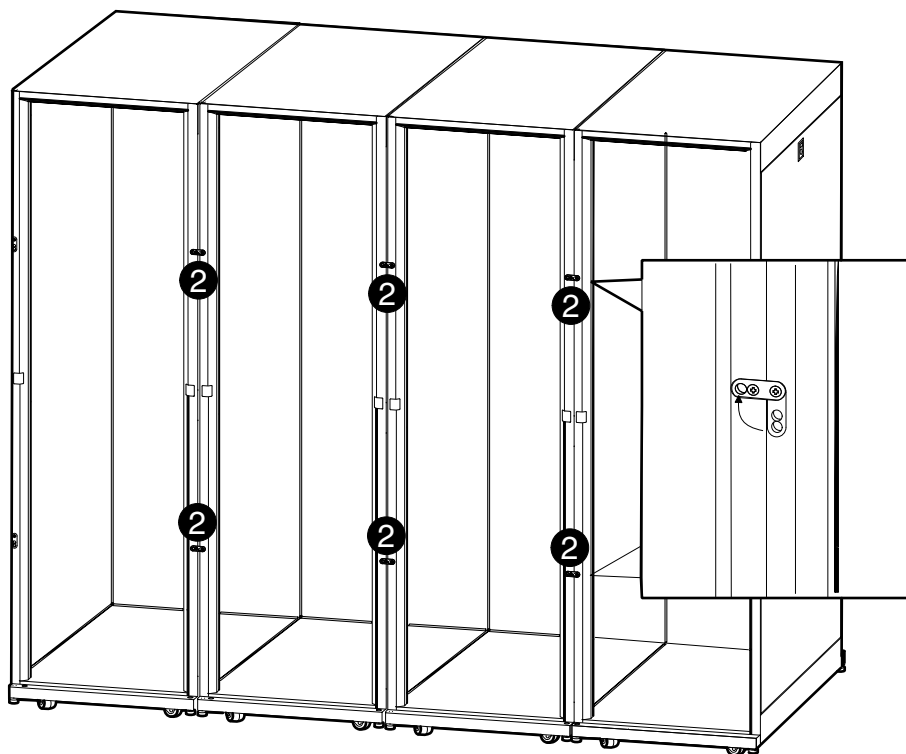
1. Connect the two equipotential bonding conductors between adjacent enclosures in the system. The bonding conductors are pre-connected to the PDU, Side Car, and all the XR Battery Enclosures. The M8 nuts and washers are supplied in the accessory kit.

## Interconnect and Level the Enclosures

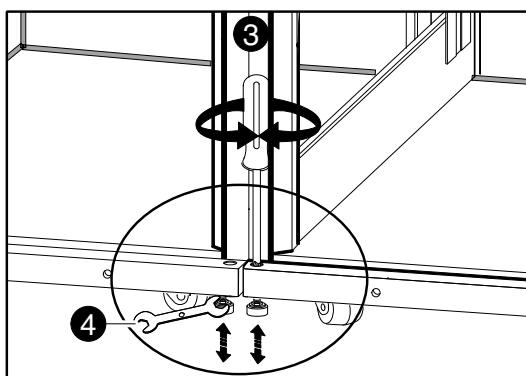


**WARNING:** The system must be installed on a level floor. The leveling feet will stabilize the enclosure, but will not account for a badly sloped floor.

1. Align the enclosures.
2. Turn the joining brackets right and secure with screw to interconnect the enclosures.



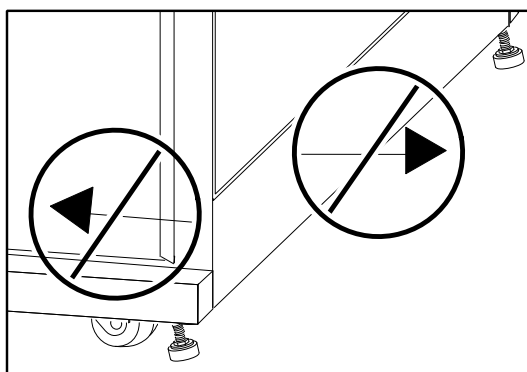
3. Use a screwdriver to lower the four leveling feet.



4. Use a 13/17 mm wrench to adjust the leveling feet.



**WARNING: Do not move the enclosure after the leveling feet have been lowered.**

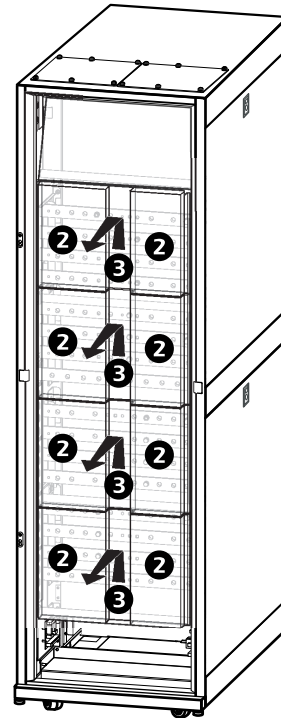


# Prepare for Cables

## Installations without PDU

1. Open the rear door of the UPS.
2. Remove all four covers, starting from the top, by loosening the two screws in each cover. Note the orientation of the covers.
3. Lift the cover up and out.

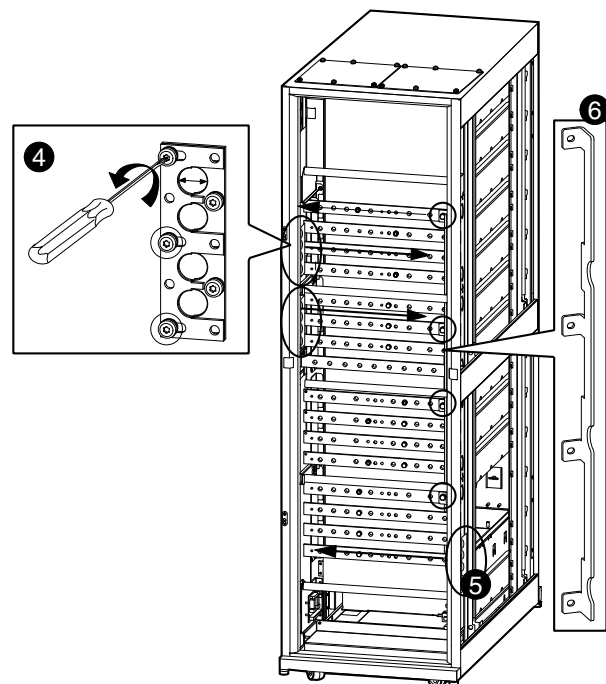
Rear of the UPS



The following steps are only applicable to systems with the PDU placed to the left of the UPS (front view):

4. Remove the two top cable reliefs from the left side and save for step 7.
5. Remove the bottom cable relief from the right side and save for step 8.
6. Remove the neutral busbar from the right side (rear view) of the UPS by loosening the four bolts, and mount the busbar on the left side of the UPS.
7. Mount the cable reliefs from step 4 on the right side (rear view).
8. Mount the cable relief from step 5 on the left side (rear view).

Rear of PDU

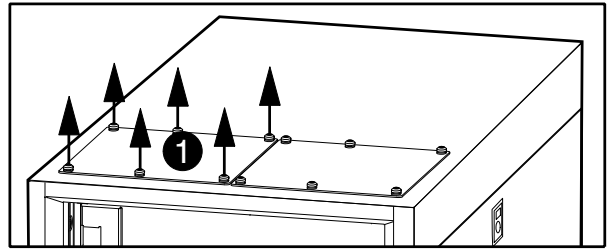


## Top Cable Entry

### Make Holes in the Top of the UPS

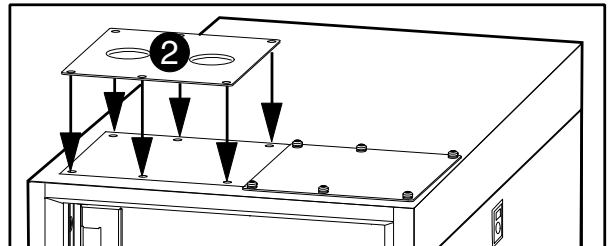
1. Remove the cover plates.

Rear of the UPS



2. Drill as many holes as necessary in the solid plate and install the conduits. Re-install the plate with the conduits installed.

Rear of the UPS

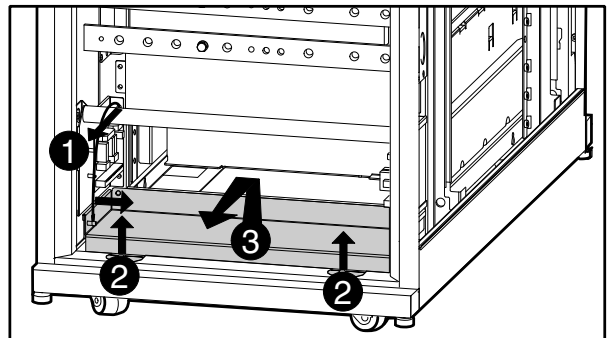


## Bottom Cable Entry

### Make Holes in the Bottom of the UPS

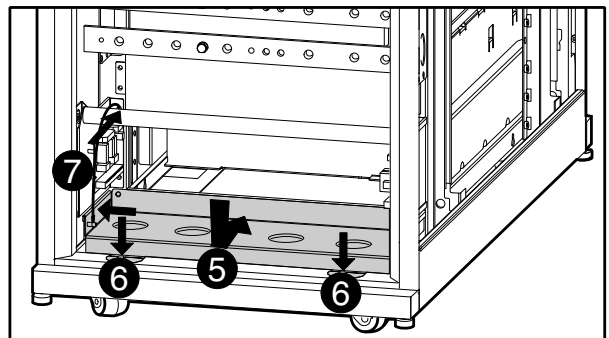
1. Disconnect the grounding cable.
2. Remove the screws in front of the bottom plate.
3. Lift the plate to remove it.
4. Drill holes in the plate and install the conduits.

Rear of the UPS



5. Re-install the plate with the conduits installed.
6. Re-install the screws in front of the plate.
7. Re-connect the grounding cable.

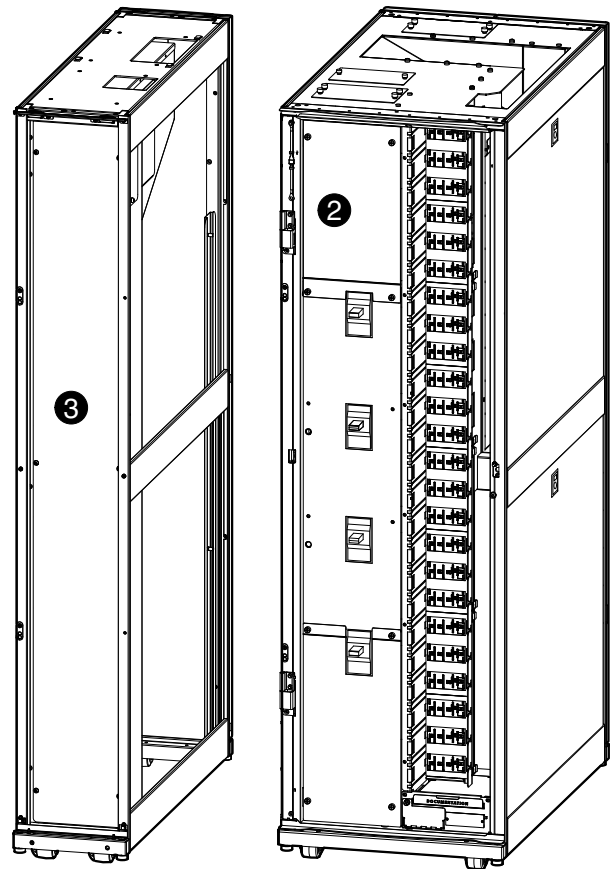
Rear of the UPS



# Installations with PDU with Transformer

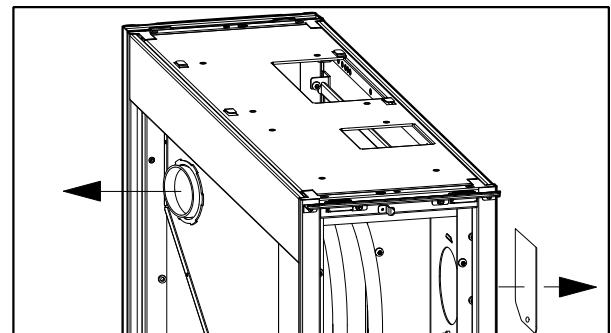
1. Open the front door of the PDU.
2. Remove the upper cover. Use a Phillips screwdriver to remove the captive panel fasteners.
3. In bottom entry systems, open the front door and remove the inner door of the Side Car.

**Front View**



4. In bottom entry systems, exchange the chase nipple and the cover plate (if necessary) to have the chase nipple placed on the side against the PDU.
5. In bottom entry systems, remove the PDU side panel from the side placed against the Side Car.

**Front View of Side Car**

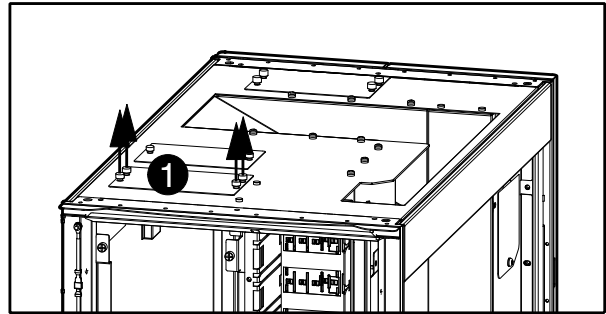


## Top Cable Entry

### Make Holes in the Top Cover of the PDU

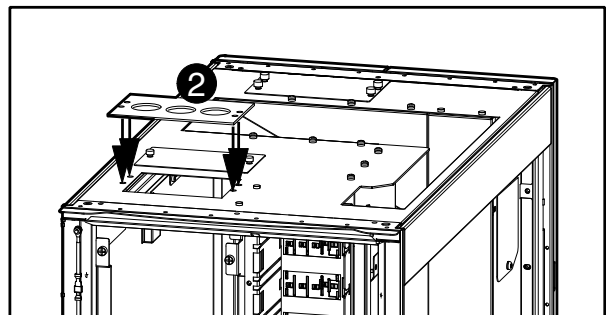
1. Remove the dedicated cover plate for power cables.

Front of the PDU



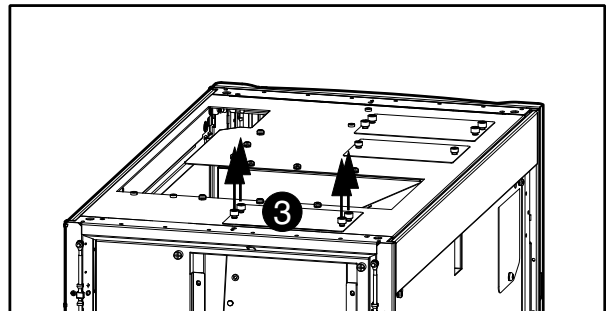
2. Drill holes in the plate for conduits. Re-install the plate with the conduits installed.

Front of the PDU



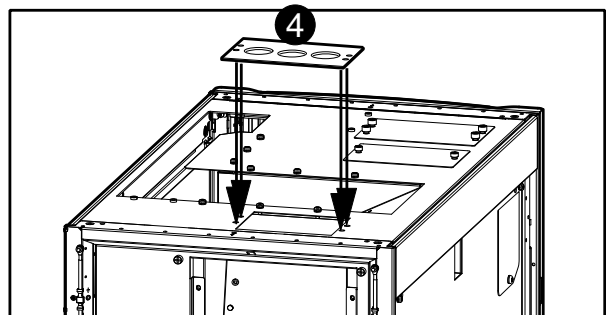
3. Remove the dedicated cover plate for subfeed breaker cables.

Rear of the PDU



4. Drill holes in the plate for conduits and re-install the plate with the conduits installed.

Rear of the PDU

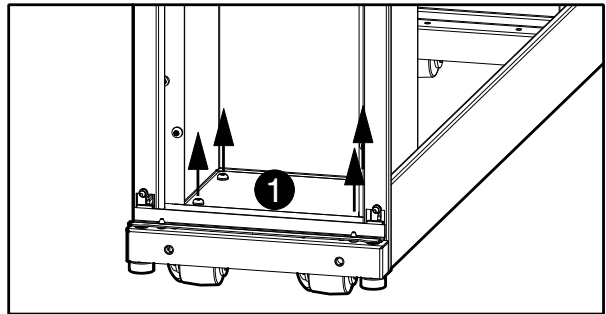


## Bottom Cable Entry

### Make Holes in the Bottom of the Side Car

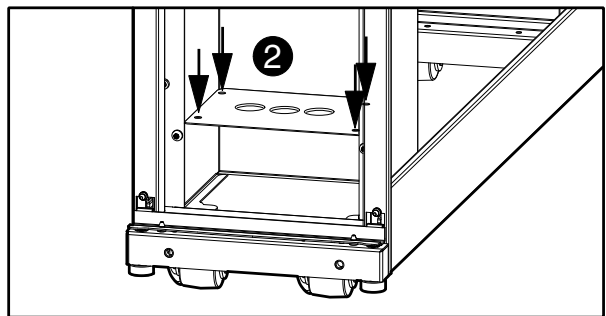
1. Remove the dedicated cover plate.

Front of the Side Car



2. Drill holes in the plate for conduits and re-install the plate with the conduits installed.

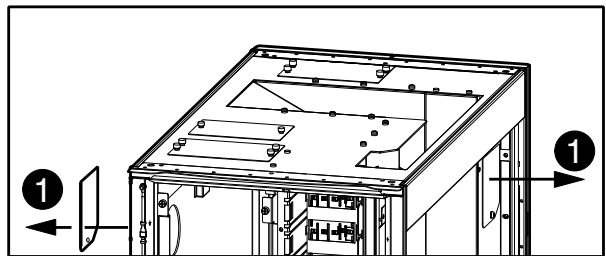
Front of the Side Car



### Make Holes in the Bottom of the PDU

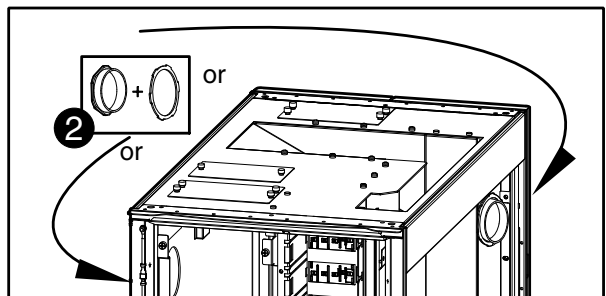
1. Loosen the bolt and remove the cover plate for side access in either the left or right side of the PDU (depending on system configuration).

Front of the PDU



2. Install the chase nipple (from the Side Car kit) in either the left or right side of the PDU (depending on system configuration). If the chase nipple protrudes beyond the side plane of the enclosure, then reverse the direction so that it does not interfere with the chase nipple from the Side Car.

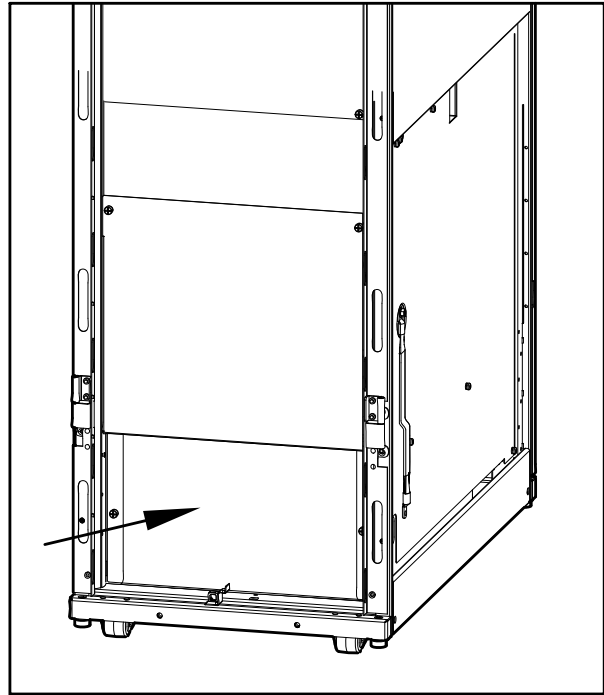
Front of the PDU



# Installations with PDU without Transformer

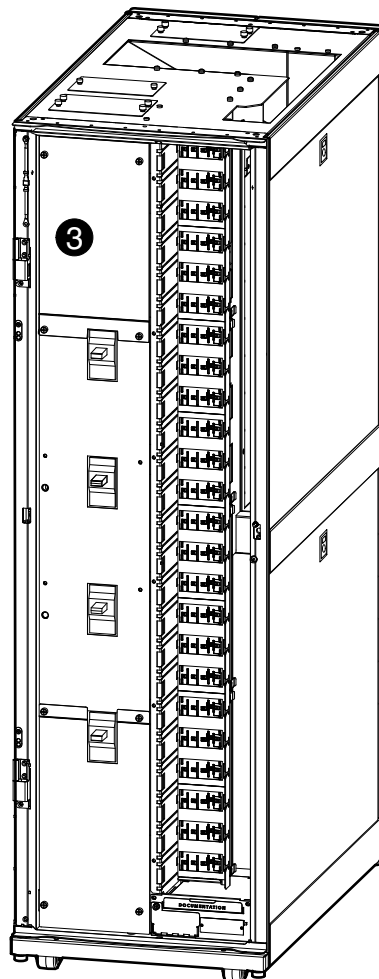
1. For top entry systems, remove the bottom cover on the rear side of the PDU and throw away or recycle the coil of conductors.

**Rear of the PDU**



2. Open the front door of the PDU.
3. Remove the upper cover. Use a Phillips screwdriver to remove the captive panel fasteners.

**Front of the PDU**



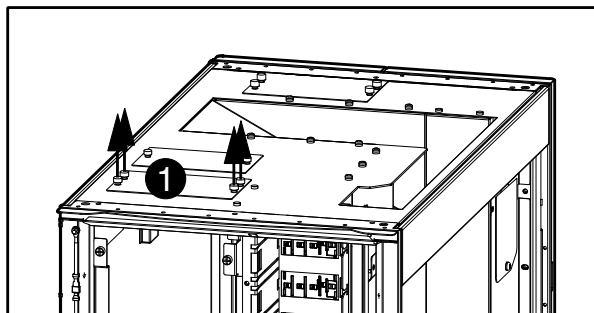


## Top Cable Entry

### Make Holes in the Top Cover of the PDU

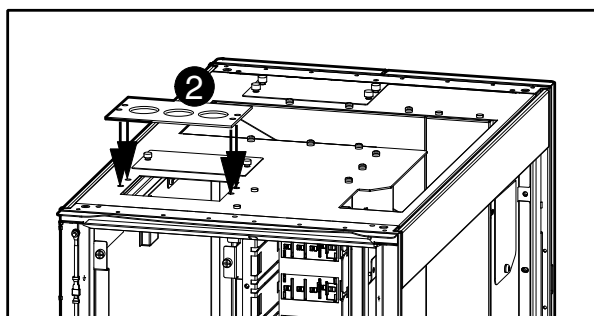
1. Remove the dedicated cover plate for power cables.

Front of the PDU



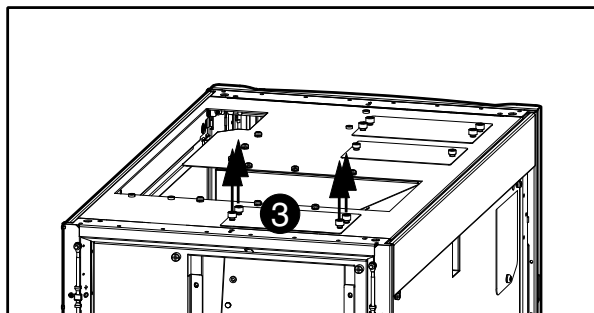
2. Drill holes in the plate for conduits. Re-install the plate with the conduits installed.

Front of the PDU



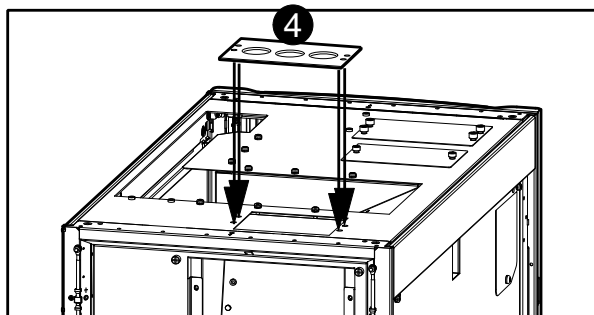
3. Remove the dedicated cover plate for subfeed breaker cables.

Rear of the PDU



4. Drill holes in the plate for conduits and re-install the plate with the conduits installed.

Rear of the PDU

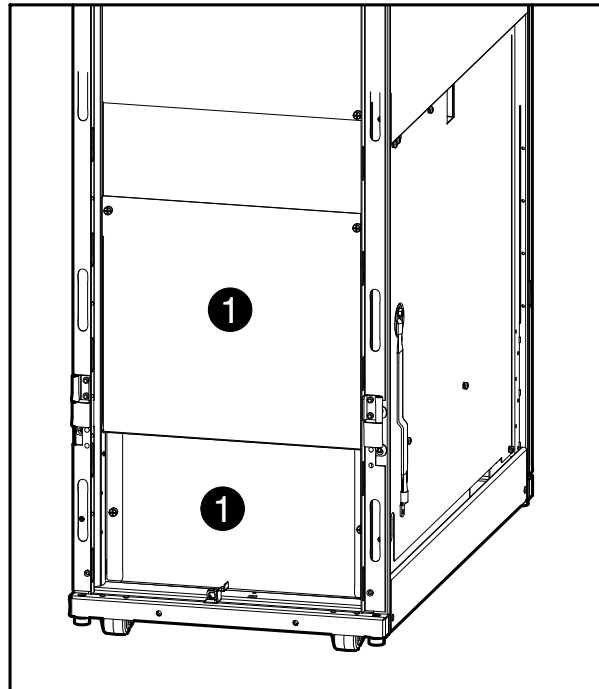


## Bottom Cable Entry

### Make Holes in the Bottom of the PDU

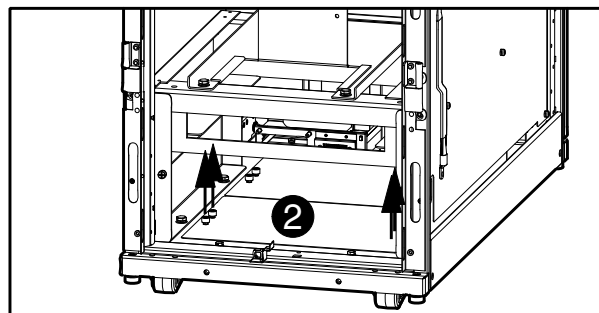
1. Remove the bottom two plates on the rear side of the PDU.

Rear of the PDU



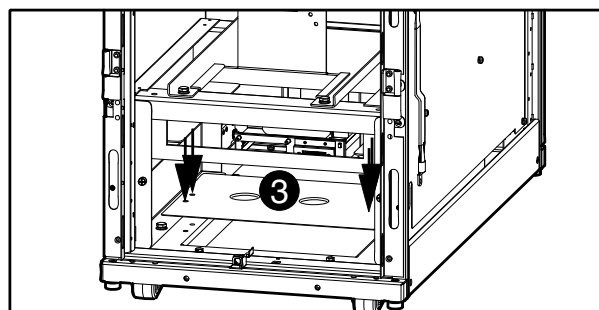
2. Remove the dedicated cover plate for power cables.

Rear of the PDU



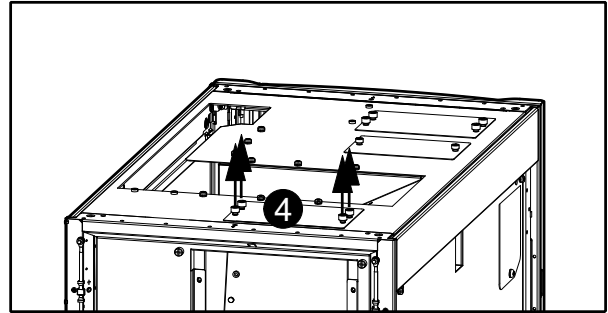
3. Drill holes in the plate for conduits and re-install the plate with the conduits installed.

Rear of the PDU



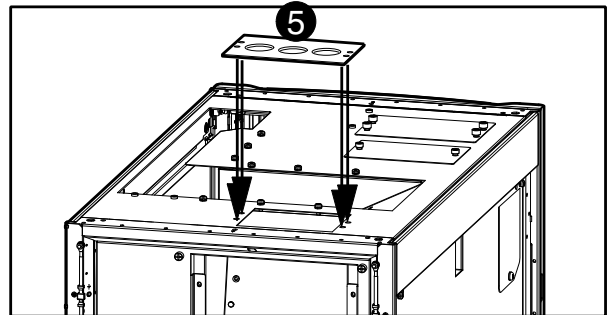
4. Remove the dedicated cover plate for subfeed breaker cables.

#### Rear of the PDU



5. Drill holes in the plate for conduits. Re-install the plate with the conduits installed.

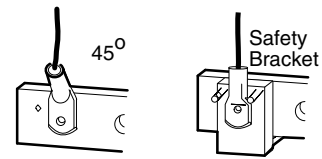
#### Rear of the PDU



# Power Cables

---

APC recommends using a 45° cable lug (not provided) for connection of power cables to the UPS. If you use straight cable lugs, install a busbar safety bracket between each busbar and cable lug to ensure a safe measure of separation. The brackets are provided with the UPS



**Note:** The neutral from AC mains input and AC bypass input is hardwired internally in the UPS. Therefore, it is not necessary to install a jumper between the two neutral connections in single mains installations.



**Note:** Do not remove the 12 pcs M10 nylon hex bolts from the busbars. Mount the cables in the open holes.



**Note:** In the UPS, route the cables on the outside of the guide rails when possible.



**Note:** The M10 bolts, washers, and cable ties are supplied in the UPS accessory kit.

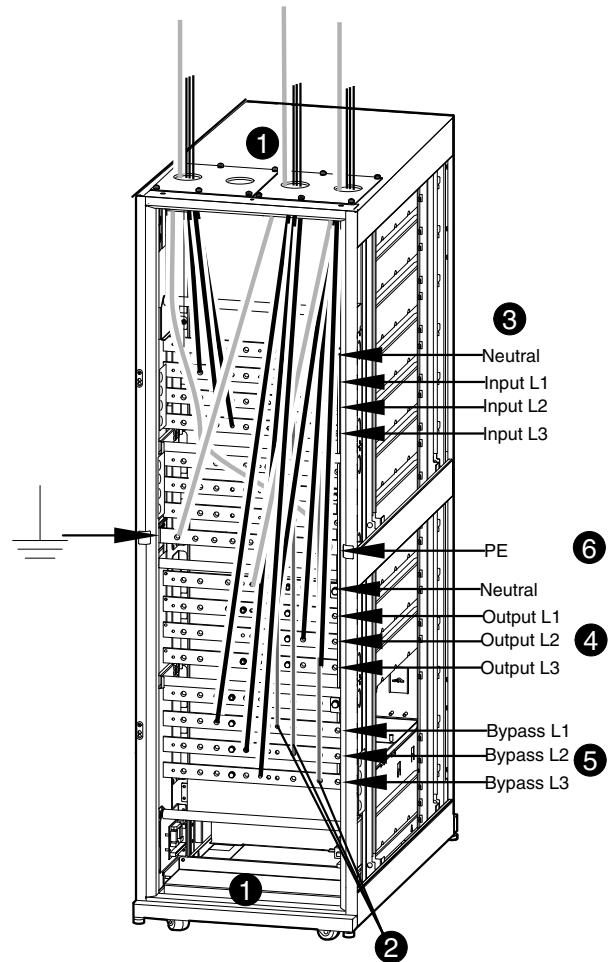
# Connect Power Conductors in Installations without PDU



**Caution:** Ensure clockwise phase rotation and neutral location. The power terminal bolt diameter is 10 mm. The required torque value is 26 Nm.

1. Route the conductors through top or bottom of the enclosure.
2. In single utility systems, install the three cables (0W3617) included with the unit. Bypass L3 to Input L3, Bypass L2 to Input L2 and Bypass L1 to Input L1.
3. Connect the input conductors to the input busbars (L1, L2, L3, N).
4. Connect the output conductors to the output busbars (L1, L2, L3, N).
5. In dual utility systems, connect the bypass conductors to the bypass busbars (L1, L2, L3).
6. Connect the PE cable in the UPS according to the symbol on the grounding rail.

## Rear of the UPS



# Connect Power Conductors in Installations with PDU with Transformer



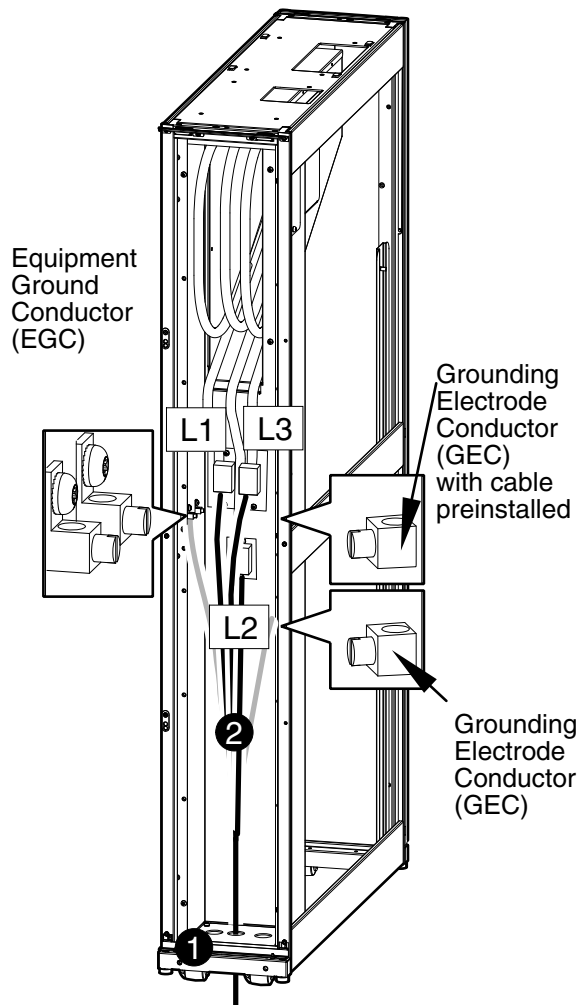
**Caution:** Ensure clockwise phase rotation and neutral location of the power terminal bolt. The required torque value is 56.5 Nm.



**Note:** For top entry systems, go directly to step 4.

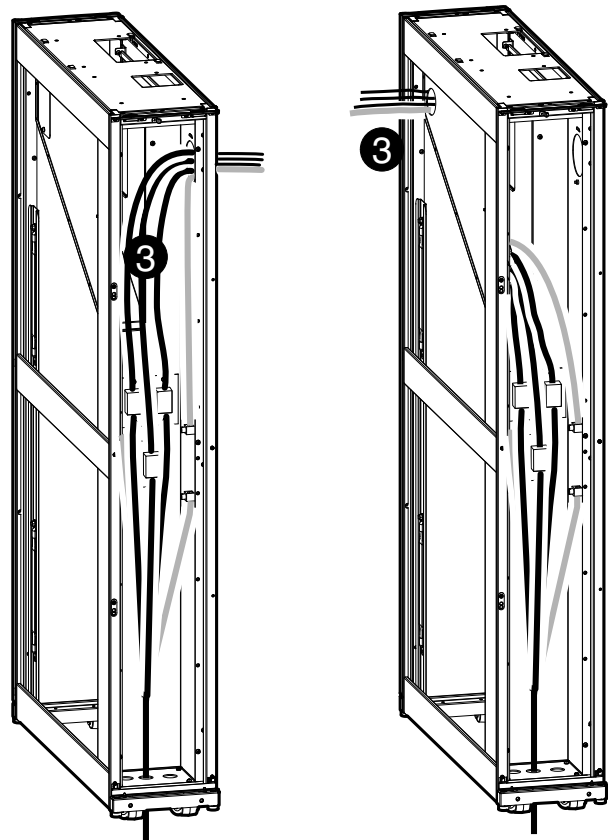
1. Route the conductors (input conductors in single utility systems or bypass conductors in dual utility systems) through the bottom of the Side Car.
2. Connect the input/bypass conductors to the L1, L2, L3, EGC, and GEC terminals and torque to specifications on label.

## Front of the Side Car

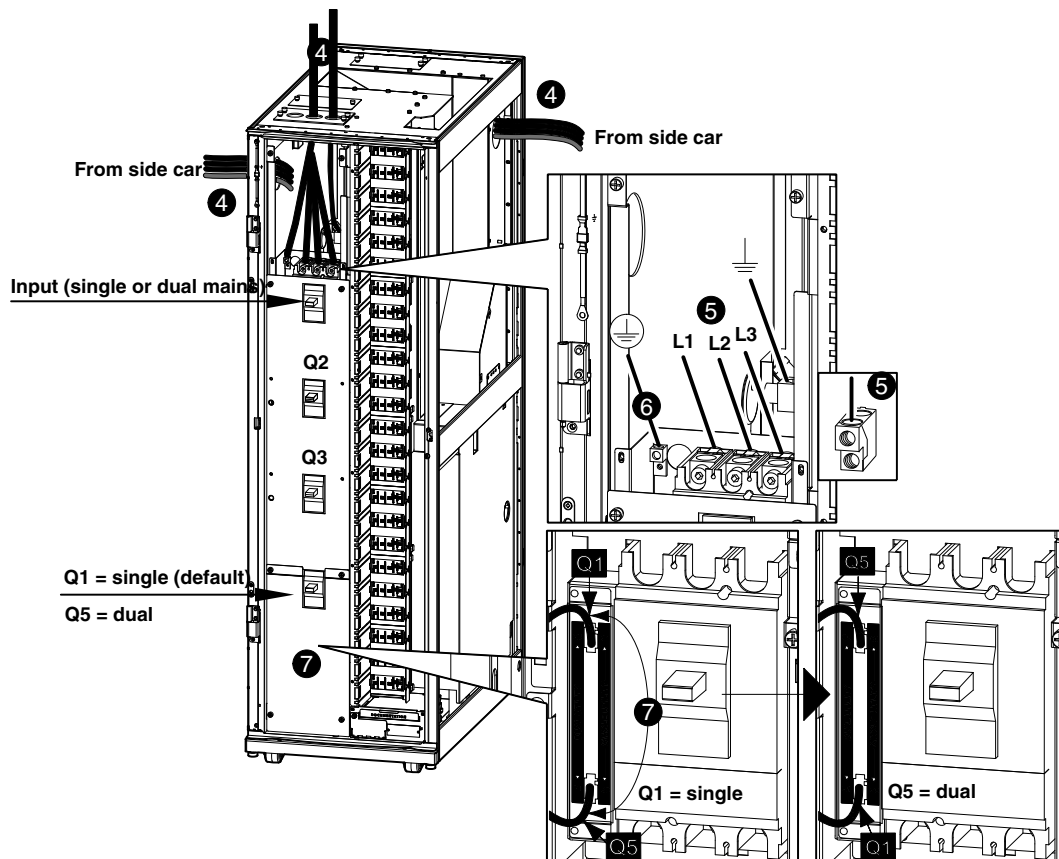


3. Take the cables that are preinstalled in the Side Car and route them through the left or right side (depending on configuration) into the PDU.
4. Route the conductors (input conductors in single utility systems or bypass conductors in dual utility systems) through the top of the PDU in top cable entry systems or through the side from the Side Car in bottom cable entry systems.
5. Connect the input/bypass conductors to the L1, L2, L3, Grounding Electrode Conductor (GEC) terminals. Note: For a 208 V PDU, install the cables on the front hole of the dual cable lugs.
6. Connect the Equipment Ground Conductor (EGC) to the terminal.
7. In dual utility systems, remove the plate and switch the cables around to have Q1 in the bottom and Q5 at the top. Use a Phillips screwdriver to remove the captive panel fasteners. Reinstall the plate.

#### Front of the Side Car



#### Front of the PDU

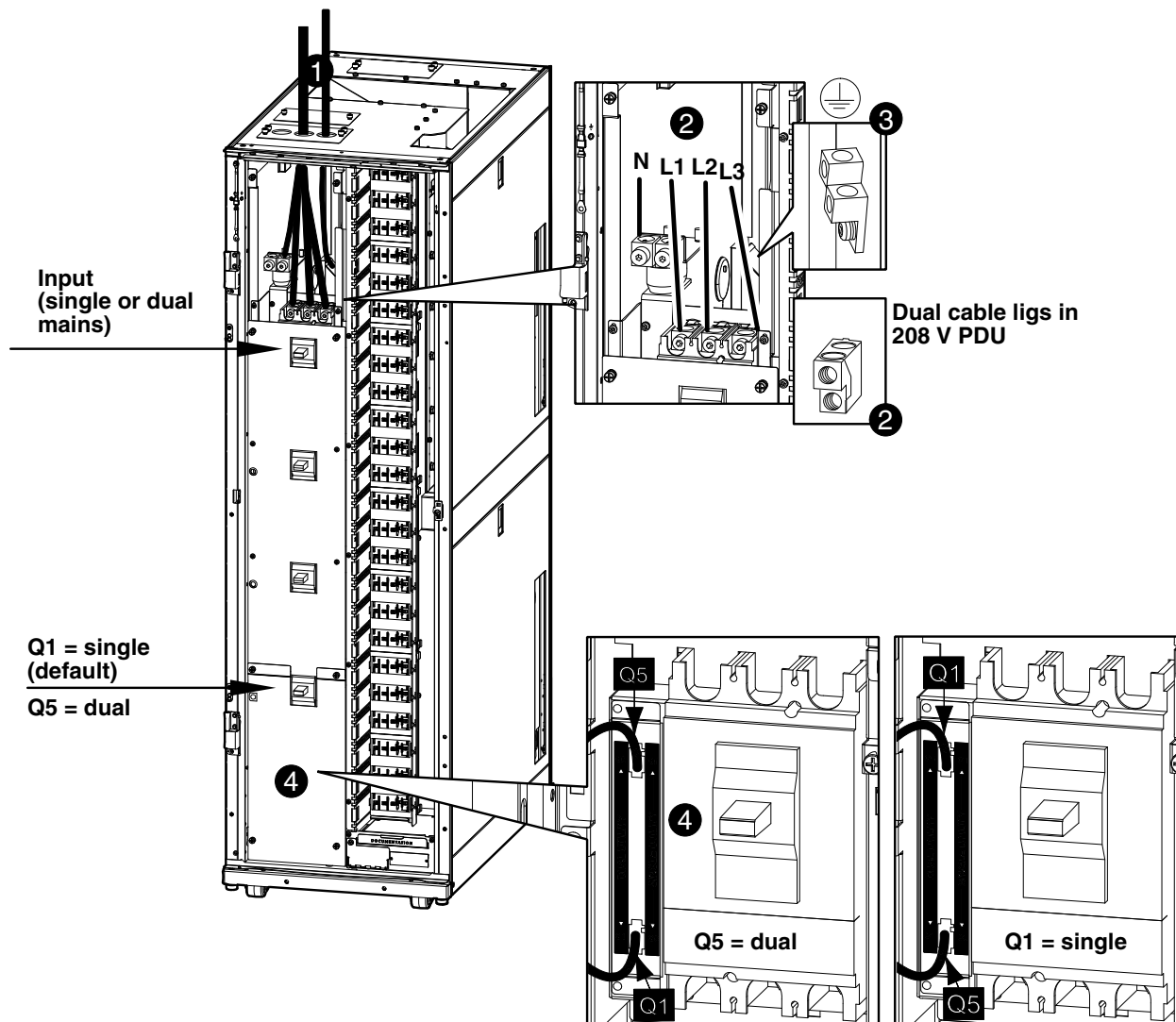


# Connect Power Conductors in Installations with PDU without Transformer — Top Cable Entry



**Caution:** Ensure clockwise phase rotation and neutral location of the power terminal bolt. The required torque value is 31 Nm.

## Front of the PDU



1. Route the conductors (input conductors in single utility systems or bypass conductors in dual utility systems) through the top of the PDU.
2. Connect the input/bypass conductors to the L1, L2, L3, N terminals. Note: For a 208 V PDU, install the cables on the front hole of the dual cable lugs.
3. Connect the Equipment Ground Conductor (EGC) to the EGC terminal.
4. In dual utility systems, remove the plate and switch the cables around to have Q1 in the bottom and Q5 at the top. Use a Phillips screwdriver to remove the captive panel fasteners. Reinstall the plate.



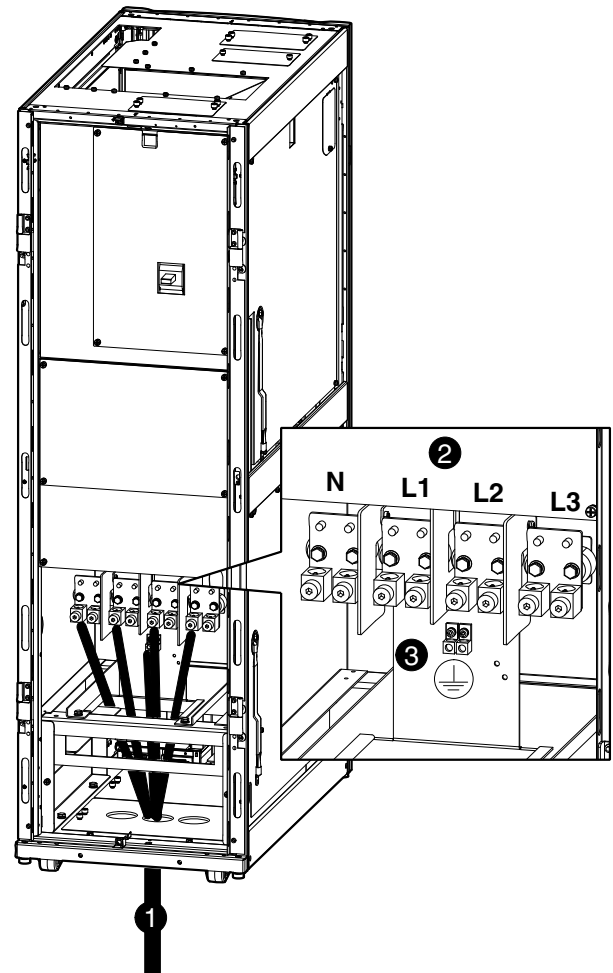
# Connect Power Conductors in Installations with PDU without Transformer — Bottom Cable Entry



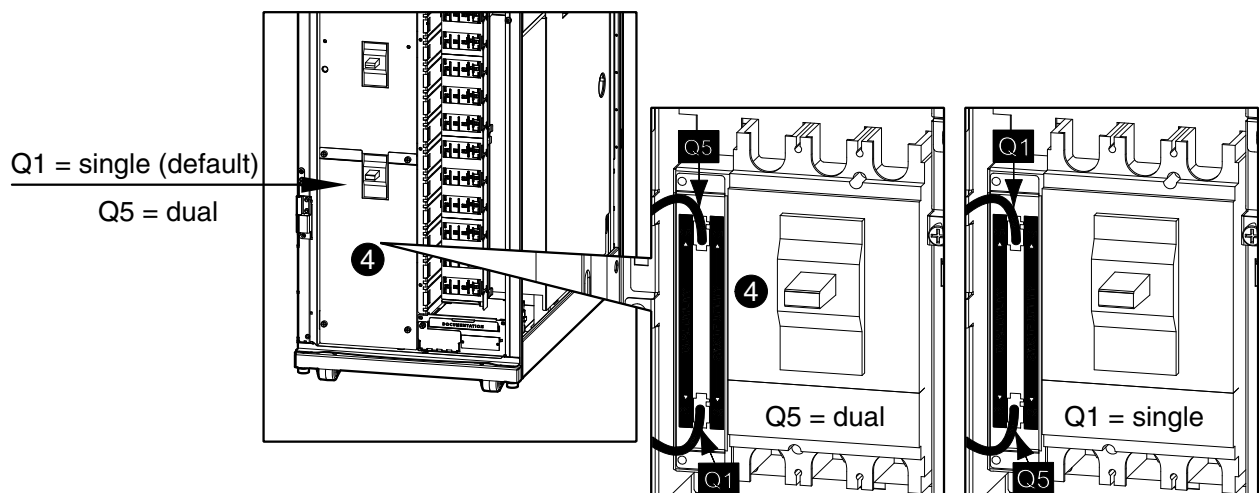
**Caution:** Ensure clockwise phase rotation and neutral location of the power terminal bolt. The required torque value is 31 Nm.

1. Route the conductors (input conductors in single utility systems and bypass conductors in dual utility systems) through the bottom of the PDU.
2. Connect the input/bypass conductors to the N, L1, L2, L3 terminals.
3. Connect the Equipment Ground Conductor (EGC) to the terminal.
4. In dual utility systems, remove the plate and switch the cables around to have Q1 in the bottom and Q5 at the top. Use a Phillips screwdriver to remove the captive panel fasteners. Reinstall the plate.

**Rear of the PDU**



**Front of the PDU**



# Connect Power Conductors between the UPS and the PDU (Applicable to all Systems with PDU)

1. Open the rear doors of the PDU and the UPS. **Rear of the PDU**

2. Remove the cover from the PDU to get access to the power conductors. Use a Phillips screwdriver to remove the captive panel fasteners.

3. Before running the conductors, loosen the three fasteners on each UPS conductor relief next to the PDU.

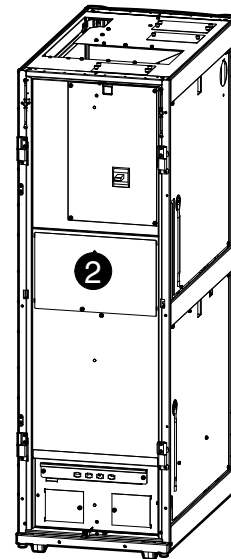
4. Cut the conductor ties and route the output and bypass/input conductors (input in single utility systems and bypass in dual utility systems) to the UPS through the conductor reliefs. Lay the conductors neatly to minimize conductor build-up.

5. Connect the output and bypass/input conductors from the PDU.

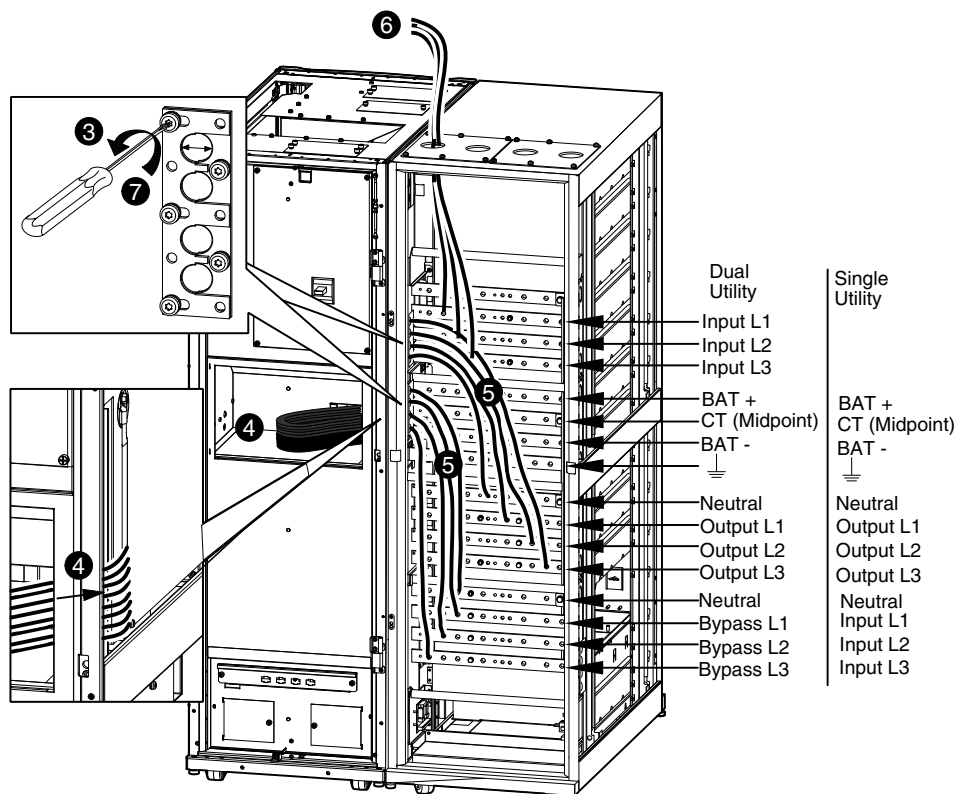
6. In dual utility systems, connect the input conductors to the input busbars (L1, L2, L3).

7. Tighten the three fasteners on each conductor relief.

8. Reinstall the cover in the PDU and close the rear doors.



## Rear of the System



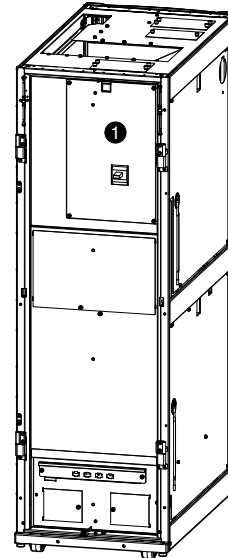
## Connect Output Cables to the Subfeed Breaker



**Caution:** Ensure clockwise phase rotation and neutral location of the power terminal bolt. Wire size and torque are specified on breaker.

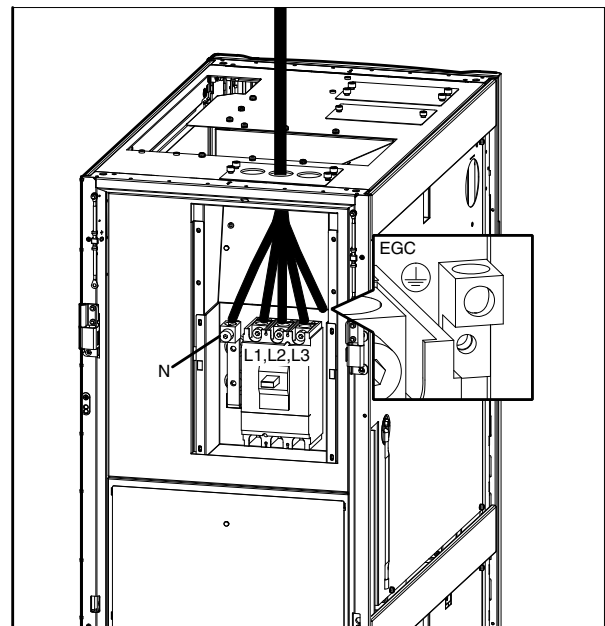
1. Loosen the four bolts and remove the inner cover to get access to the subfeed breaker.

**Rear of the PDU**



2. Route the output cables through the top of the PDU and connect them to the subfeed breaker.

**Rear of the PDU**

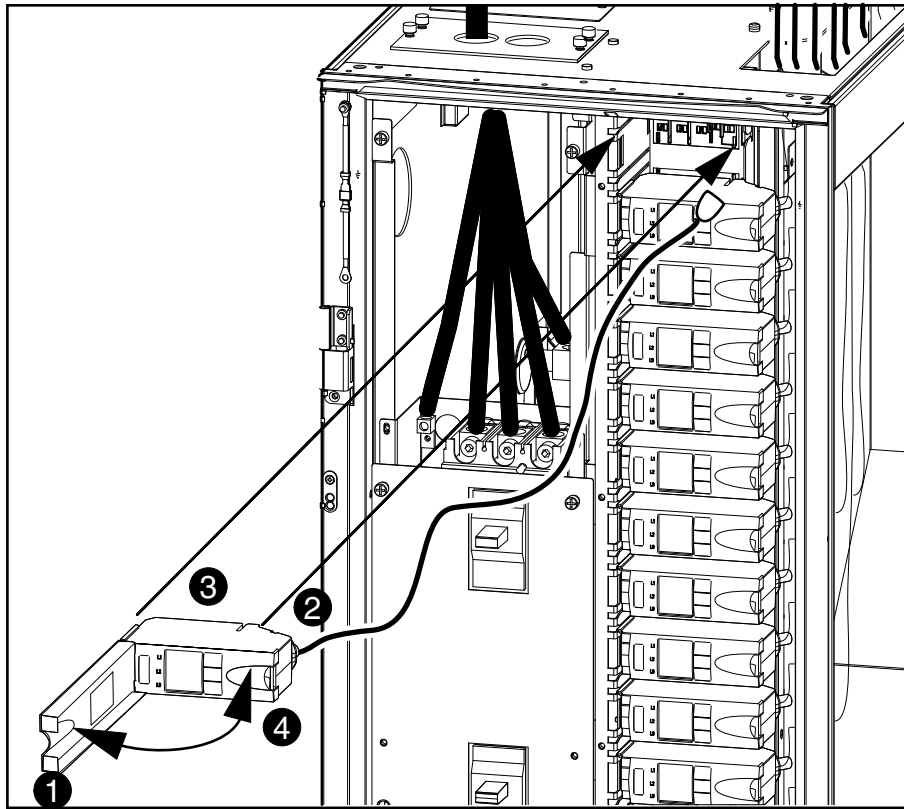


## Install and Connect Output Cables to the Power Distribution Module



**Note:** Power Distribution Modules and backplanes are colour-coded: black for 120/208 V and grey for 240/415 V. The colour of the backplane and the colour of the rear of the Power Distribution Module must be black for 120/208 V.

### Front of the PDU



1. Open the latch on the front of the power distribution module.
2. Route the cable on the power distribution module through the top of the enclosure.
3. Slide the power distribution module into place.
4. Secure the latch to lock the module.

# Battery Cables

---

## Install the APC Battery Solution

The Symmetra PX 100 kW UPS can monitor up to four APC XR Battery Enclosures.



**Caution:** The system accepts up to 300 kcmil cables. The power terminal bolt diameter is 10 mm and the required torque value is 26 Nm.



**Note:** In installations with non-APC batteries, follow the documentation provided with the batteries.



**Note:** In remote installations, panels should be installed on free ends (part number 0M-7171D).

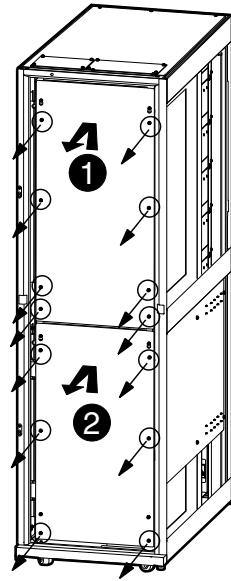
## Connect the Battery Cables between the XR Battery Enclosures



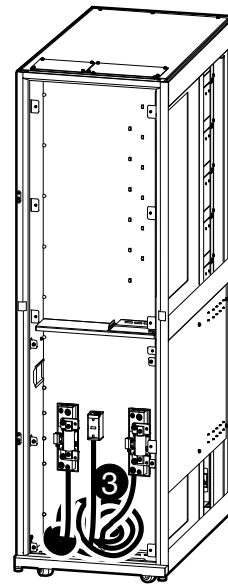
**WARNING:** For remote XR Battery Enclosures, the length of the signal and power cables must not exceed 200 m, on the cable that connects the XR Battery Enclosure to the UPS. For power cables between 50 and 200 m, the voltage drop must be taken into account when the cable size is chosen.

1. In top entry systems, loosen the two top bolts and remove the eight lower bolts from the upper cover plate. Lift the plate to remove it.
2. Loosen the two top bolts and remove the eight lower bolts from the lower cover plate. Lift the plate to remove it.
3. Unwind the cables included in each XR Battery Enclosure. Remove the cable lugs from the cables that will connect to other XR Battery Enclosures. For the cables that will connect to the UPS, cut off the cable lug on the end that will be mounted in the XR Battery Enclosure.

**Rear of the XR Battery Enclosure**

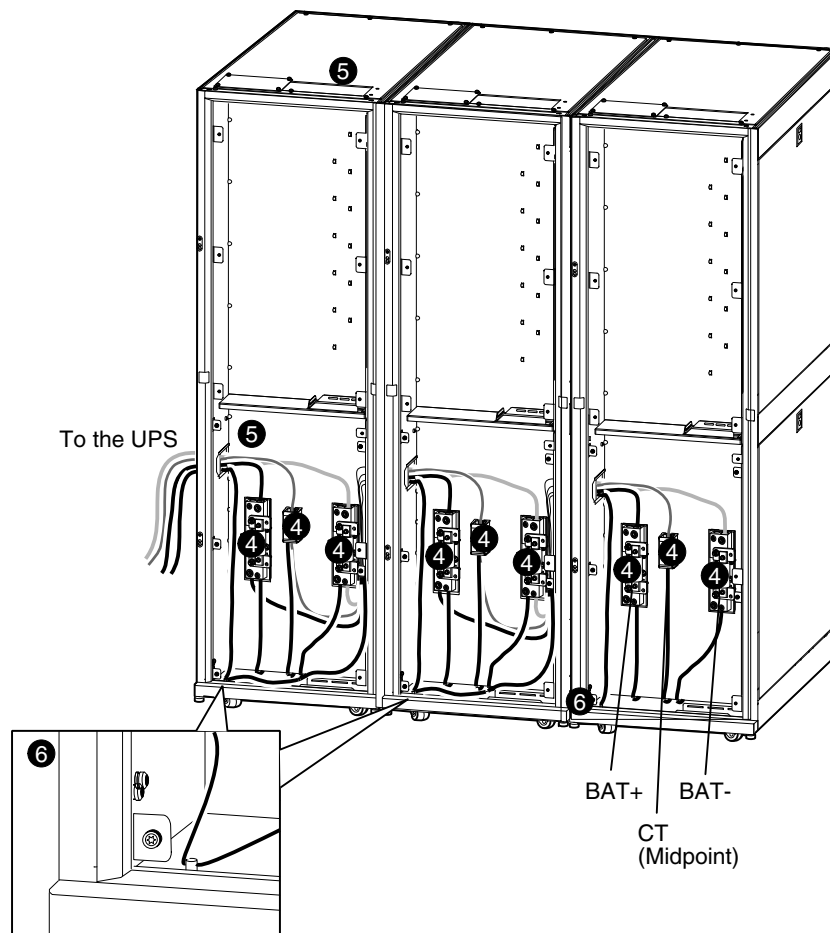


**Rear of the XR Battery Enclosure with the plates removed**

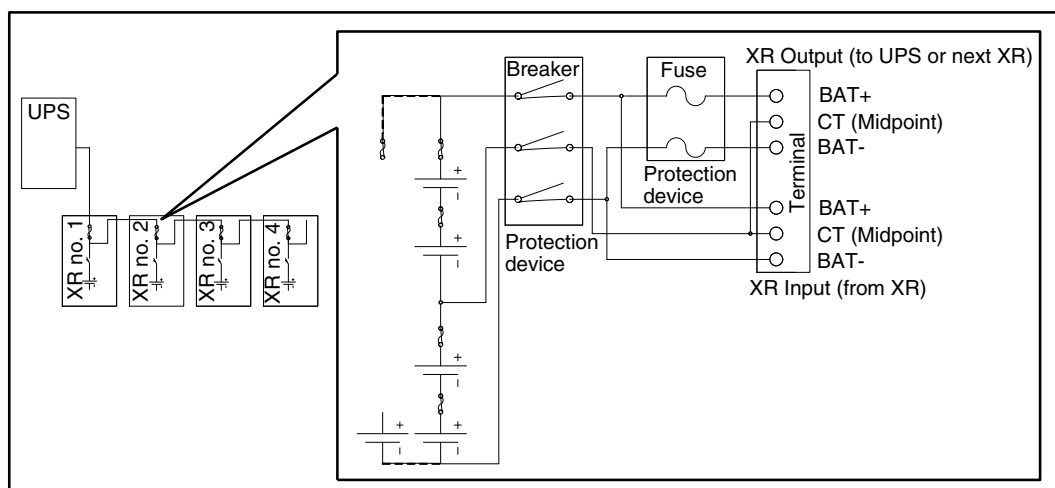


4. Connect the BAT+, BAT-, and CT (midpoint) cables between the XR Battery Enclosures.
5. Route the BAT +, BAT-, and CT (midpoint) cables from the first XR Battery Enclosure to the UPS through the side, top, or bottom.

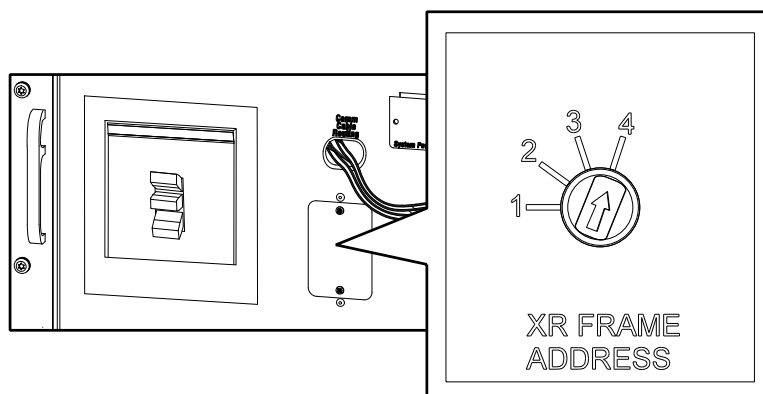
**Rear of the XR Battery Enclosures**



- Connect the equipment grounding cable in the XR Battery Enclosure that is farthest from the UPS. Route it through each XR Battery Enclosure to the UPS through the side, top, or bottom.



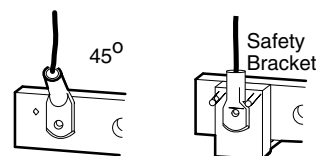
- Set the enclosure address on the front side of each XR Battery Enclosure and PDU/XR front side.



## Connect the Battery Cables to the UPS

The cables can be routed through the side, top, or bottom.

APC recommends using a 45° cable lug. If you use straight cable lugs, install a busbar safety bracket between each busbar and cable lug to ensure a safe measure of separation. The brackets are provided with the UPS.



**Note:** Do not remove the 12 pcs M10 nylon hex bolts from the busbars. Mount the cables in the open holes.



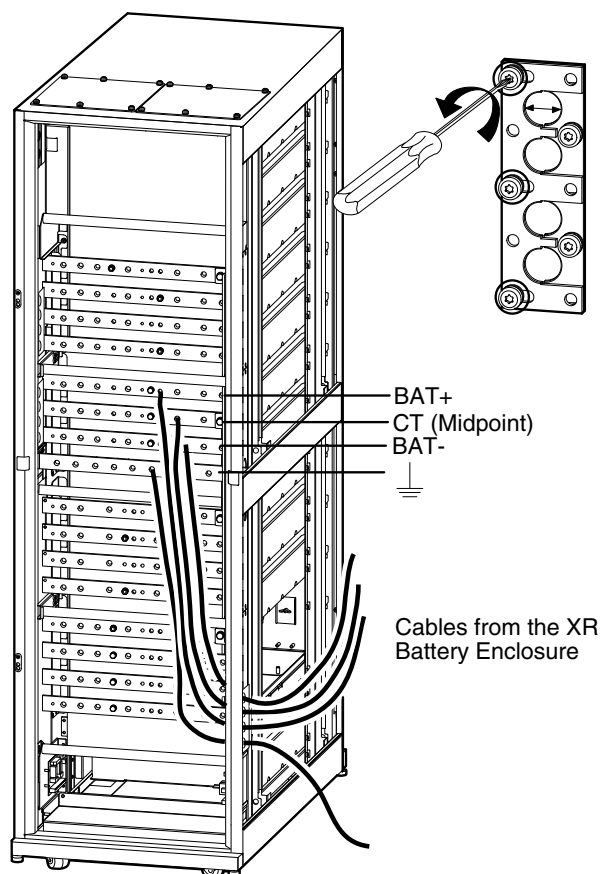
**Note:** The M10 bolts, washers, and cable ties are supplied in the UPS accessory kit.



**Note:** The procedure below shows how to connect the battery cables in systems with side cable entry. In top or bottom cable entry systems, run the cables to either the top or the bottom and connect them to the busbars according to the labels.

1. Before running the cables through the side, loosen the three bolts on the cable relief next to the XR Battery Enclosure.
2. Route the battery cables to the UPS through the holes in the cable relief.
3. Mount the cables to the busbars according to the labels.
4. Tighten the three bolts on the cable relief.

### Rear of the UPS





# Emergency Power Off (EPO) Switch



**Note:** EPO switch wiring must comply with local and national Code wiring rules. Review the planned EPO installation and operation with the local Authority Having Jurisdiction (AHJ) before proceeding with the final installation.



**Note:** Connection in spring push connectors has to be made by single solid core or multiple stranded wire terminated with a cable ferule.



**Note:** The UPS can continue to supply AC power to the load until all AC and DC sources have been disconnected. The built-in EPO function disconnects only the internal DC sources. To fully de-energize all AC and DC power in the UPS, the upstream circuit breaker protecting the input feeder circuit to the UPS must be provided (by others) with a tripping mechanism (usually a shunt trip). The status of the upstream external circuit breaker can be monitored via the circuit breaker's aux. switch at the Maintenance Bypass Panel interface.



**Note:** The remote disconnect control (EPO station) must provide a dry contact signal (normally open or normally closed) to the UPS and simultaneously provide a signal to the trip mechanism on the upstream external circuit breaker feeding the UPS.

The UPS can be connected to either a dry contact or an external 24 VDC source.

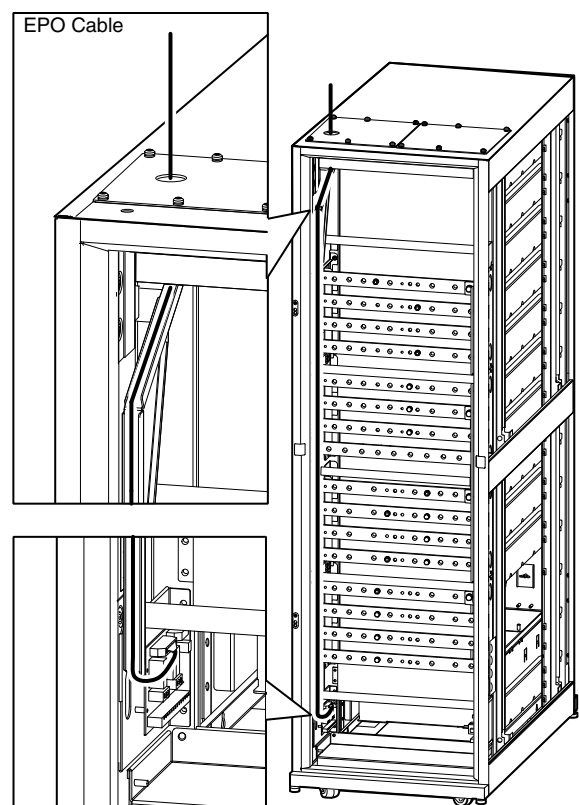
The EPO circuit is considered Class 2 and SELV (Safety Extra Low voltage). A SELV circuit is isolated from primary circuitry through an isolating transformer and designed so that under normal conditions, the voltage is limited to 42.4 Vac peak or 60 VDC. SELV and Class 2 circuits must be isolated from all primary circuitry. Do not connect any circuit to the EPO terminal block unless it can be confirmed that the circuit is SELV or Class 2.

## Installations in the US:

- CL2Class 2 cable for general purpose use
- CL2Plenum cable for use in a vertical shaft or from floor to floor
- CL2R Racer cable for use in dwellings and raceways
- CL2XLimited use cable for dwellings and raceways

## Installations in Canada:

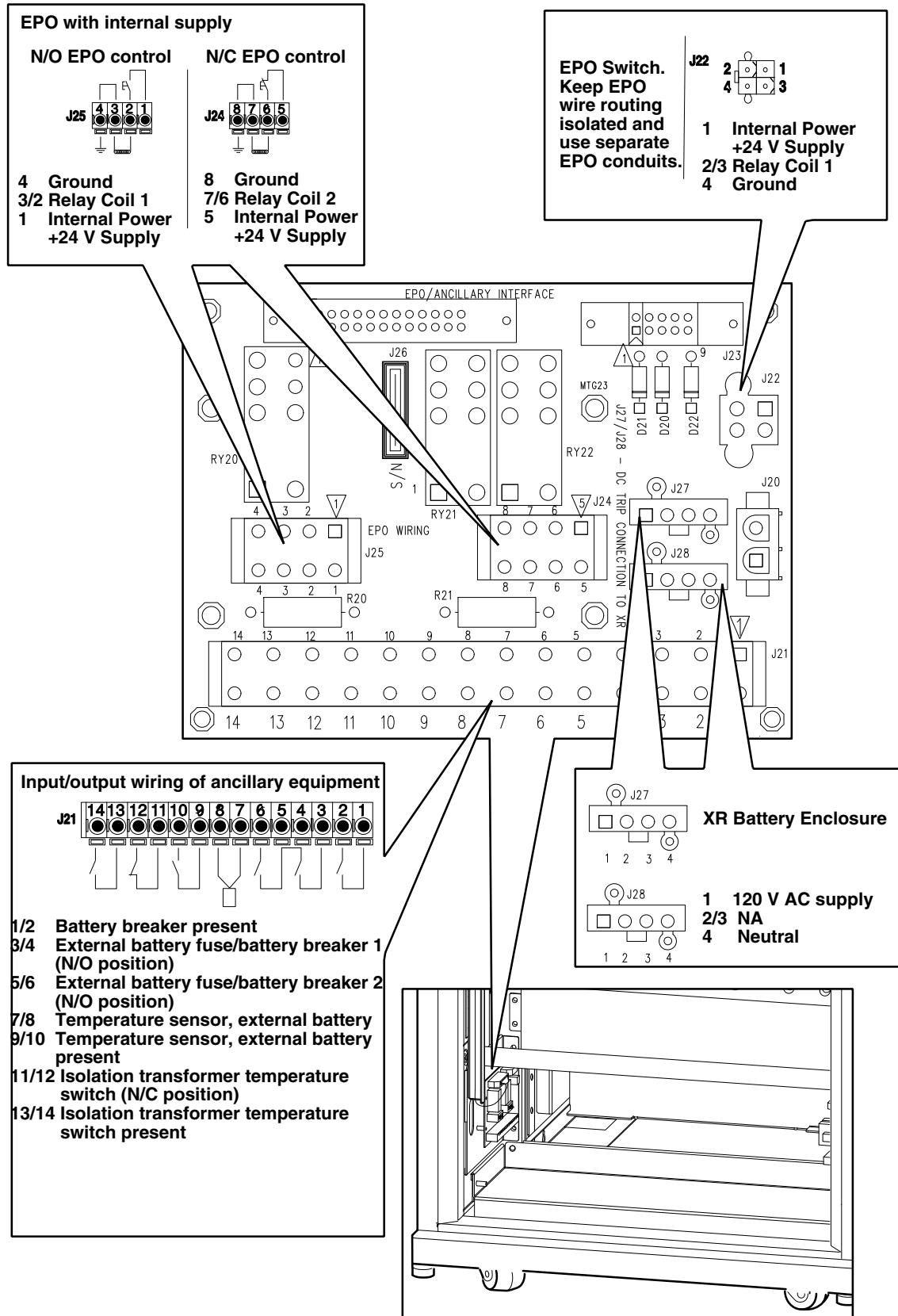
- CL2RCertified, type ELC (Extra-Low-Voltage Control Cable)
- CL2XCertified, type ELC (Extra-Low-Voltage Control Cable)



# EPO switch wiring diagram



**Note:** The system is configured for installations without EPO. In systems with N/O EPO, connect the EPO to J25 pin 1 and 2. In systems with N/C EPO, remove the jumper from J24 pin 5 and 6 and connect the EPO to J24 pin 5 and 6.

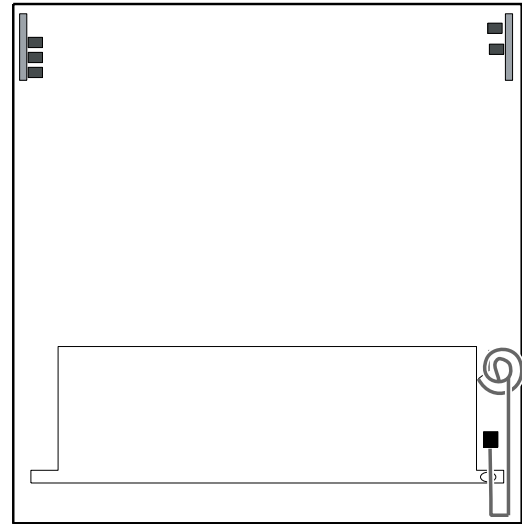


# Communication Wires

---

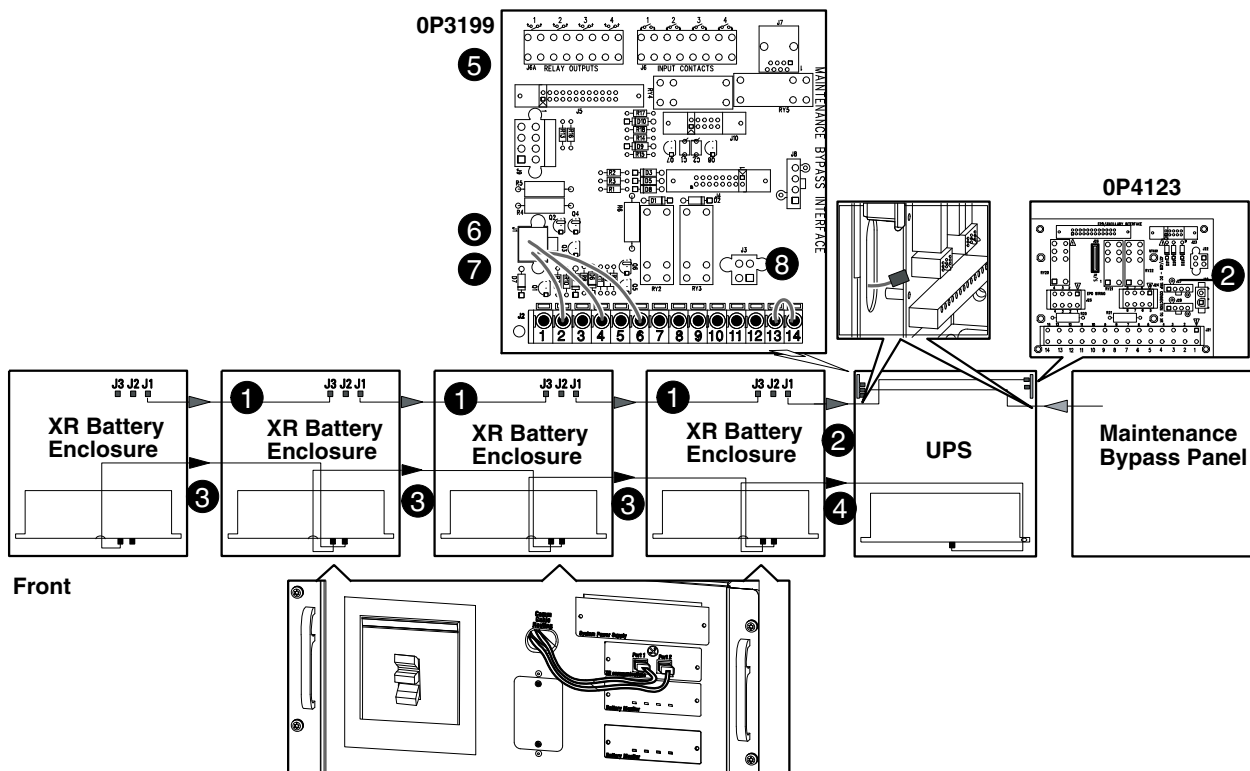
## Connect Network Communication Wire

1. The network communication wire (supplied) has been pre-connected to the UPS and is located on the top of the enclosure. Connect the cable to your local area network.



Front

# Connect Communication Wires in Installations without PDU



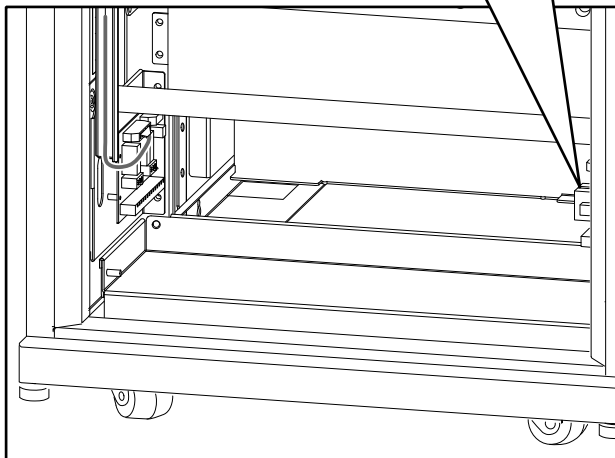
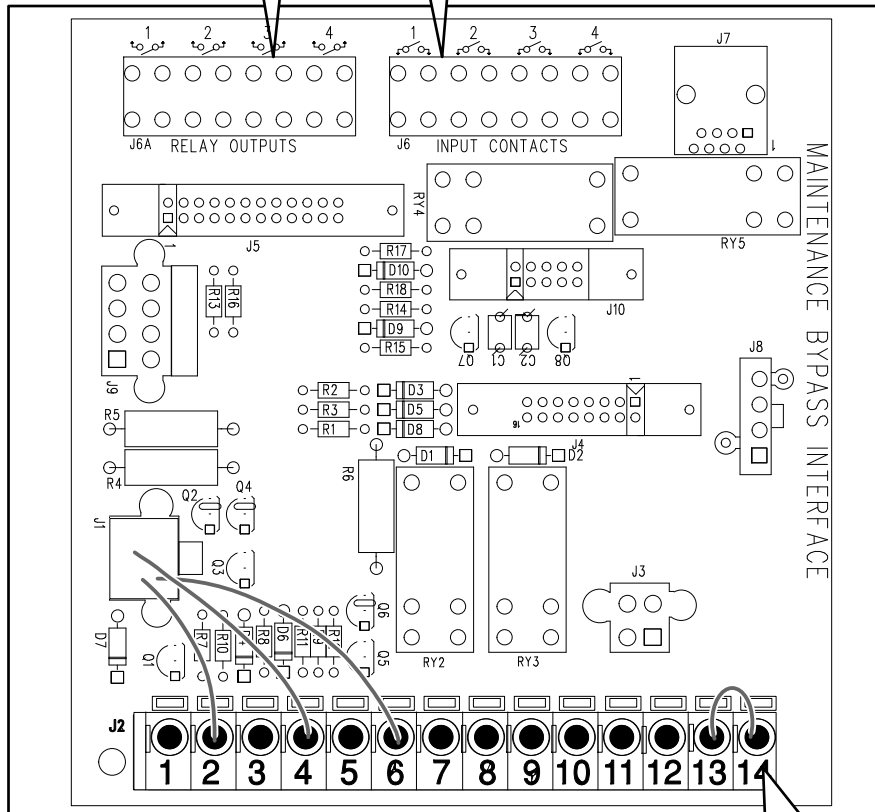
1. Route the battery breaker trip cable from J1 in the first XR Battery Enclosure to J3 in the next XR Battery Enclosure. Repeat the procedure for all XR Battery Enclosures.
2. Route the battery breaker trip cable from J1 in the last XR Battery Enclosure to J27 on the EPO/ancillary interface board (OP4123) in the UPS (for remote XR Battery Enclosure the length of the signal must not exceed 200 m).
3. Route the communication cable from XR Communications port 1 in each XR Battery Enclosure to port 2 in the next XR Battery Enclosure. Remove the terminator when necessary.
4. Route the communication cable from XR Communications port 1 in the last XR Battery Enclosure to the UPS XR Communications port 2 (for remote XR Battery Enclosure the length of the signal must not exceed 200 m).
5. Route the communication cables from the maintenance bypass panel to the maintenance bypass interface board (OP3199) in the UPS. Refer to the wiring diagram on the next page for connection information.
6. In installations with external switch gear, remove jumper wire harness between J1 and J2.
7. In installations without any switch gear, install jumper wire harness between J1 and J2.
8. Remove the jumper between pins 13 and 14 in J2 in installations without PDU.

## Maintenance Bypass Panel Interface

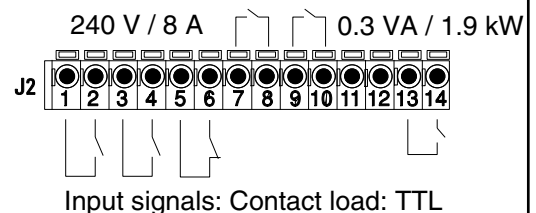


**WARNING:** Ensure that the wires are properly retained and kept away from high-voltage lines and breakers.

Make contact closure connections (N/O or N/C) to monitor dry contacts. Up to eight connections can be made - four input contacts and four output relays.

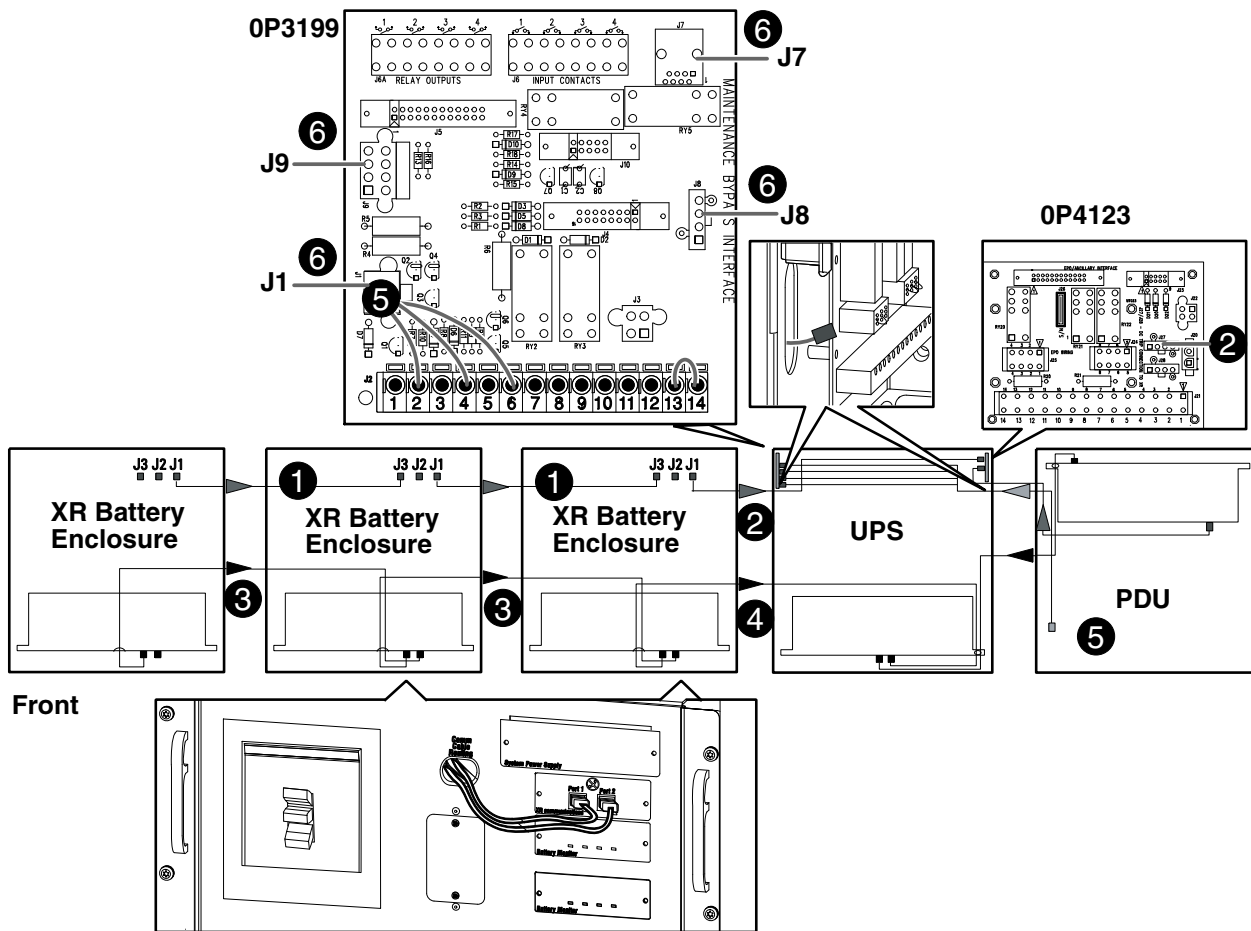


### Output relays:



- 1/2 Q001 UPS input switch (N/O position)
- 3/4 Q002 UPS output switch (N/O position)
- 5/6 Q003 UPS service bypass switch (N/C position)
- 7/8 OK to operate UPS output switch Q002
- 9/10 OK to operate service bypass switch Q003
- 11/12 Not used
- 13/14 External switchgear present

# Connect Communication Wires in Installations with PDU



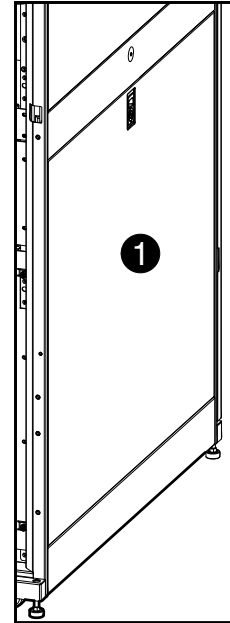
1. Route the battery breaker trip cable from J1 in the first XR Battery Enclosure to the J3 port in the next XR Battery Enclosure. Repeat the procedure for all XR Battery Enclosures.
2. Route the battery breaker trip cable from J1 in the last XR Battery Enclosure to J27 on the EPO/ancillary interface board (0P4123) in the UPS (for remote XR Battery Enclosure the length of the signal must not exceed 200 m).
3. Route the communication cable from XR Communications port 1 in each XR Battery Enclosure to port 2 in the next XR Battery Enclosure. Remove the terminator when necessary.
4. Route the communication cable from the XR Communications port 1 to port 2 in the last XR Battery Enclosure in the row to the UPS XR Communications port 2 (for remote XR Battery Enclosure the length of the signal must not exceed 200 m).
5. In installations with PDU, remove jumper wire harness between J1 and J2.
6. Route the four PDU communication cables from the PDU to J7, J8, J9, and J1 on the maintenance bypass interface board (0P3199) in the UPS.

# Install Seismic Option

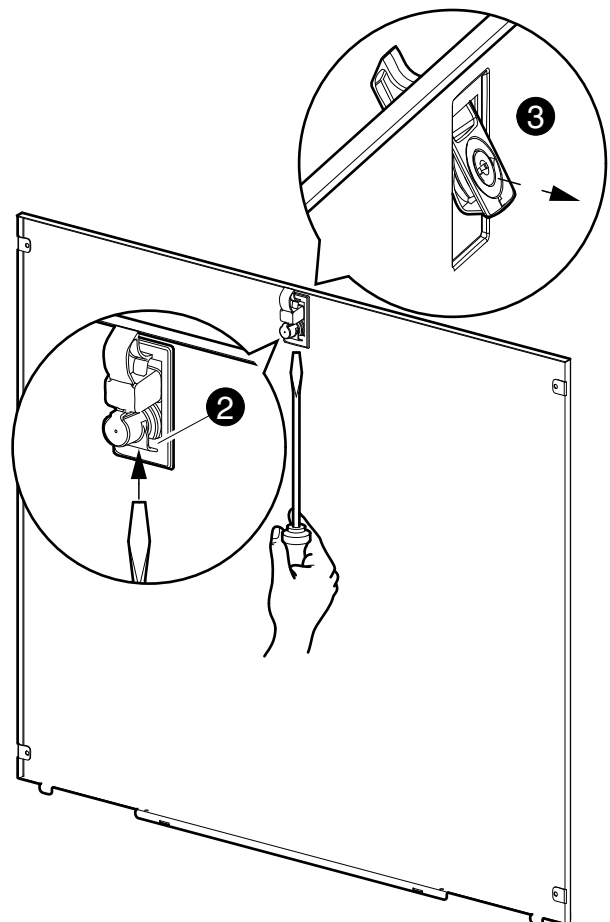
---

## Replace the Side Panel Lock

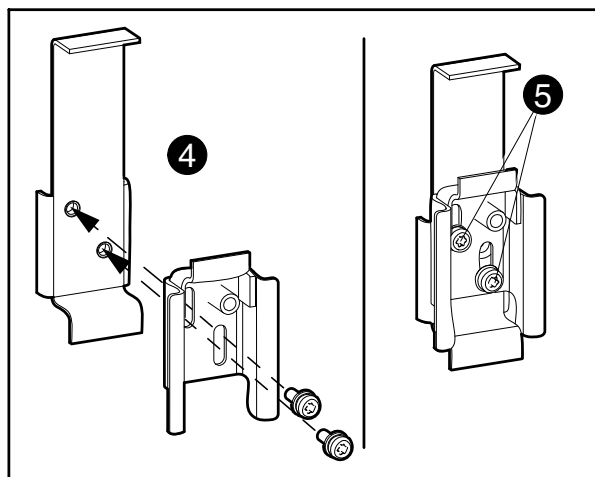
1. Remove the side panel from the end of row enclosures.



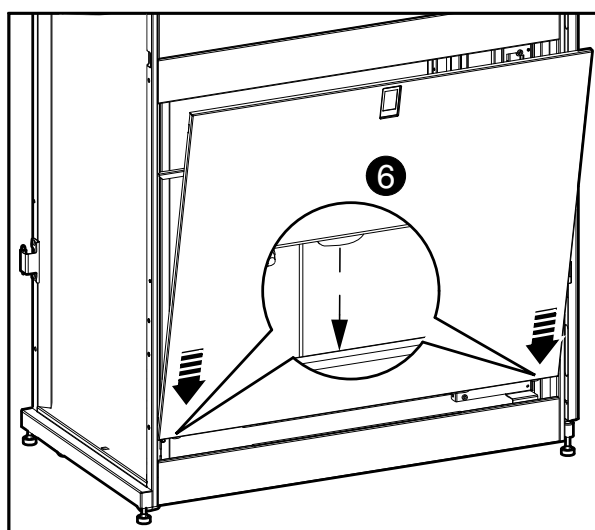
2. Use a screwdriver to press on the tap that secures the lock to the side panel.
3. Pull the lock out and up and remove it from the side panel.



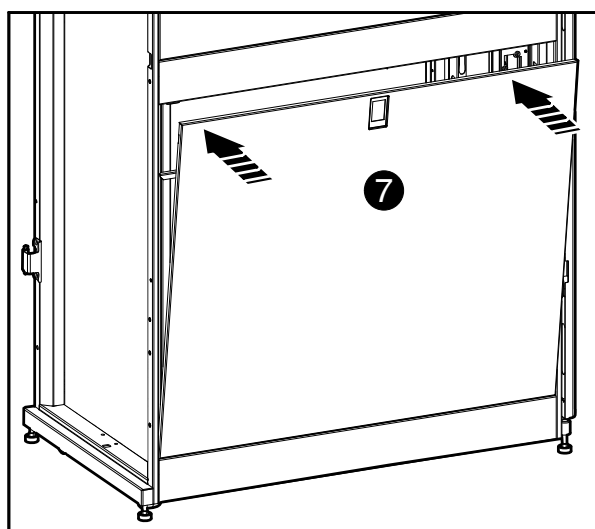
4. Put the two lock parts together.
5. Loosely tighten the screws.



6. Place the side panel at an angle at the bottom of the frame.

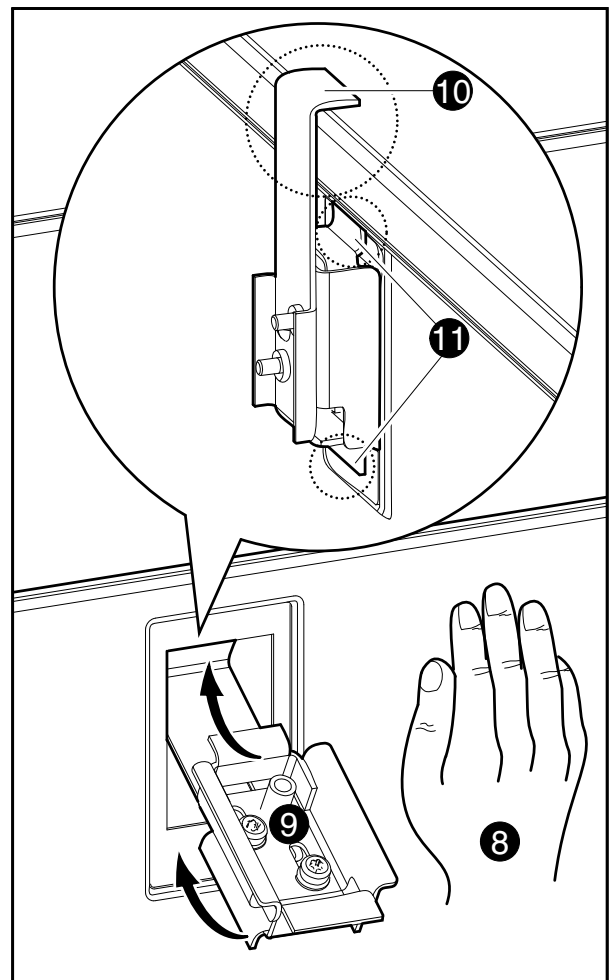


7. Push the top of the side panel in place.

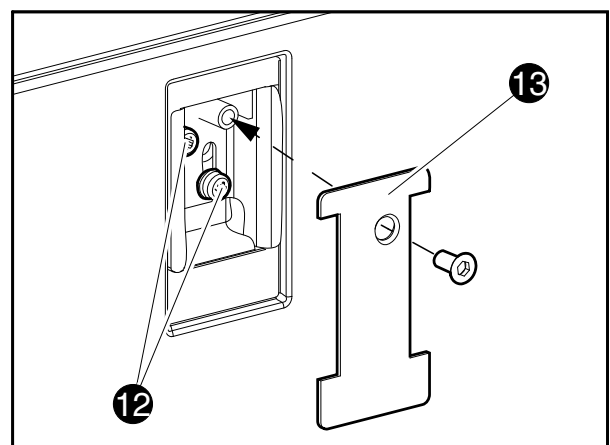




8. Hold the side panel with one hand.
9. Take the lock assembly and guide the top through the hole in the side panel.
10. Lift the lock assembly in place.
11. Ensure that the upper and lower taps are hidden behind the side panel.

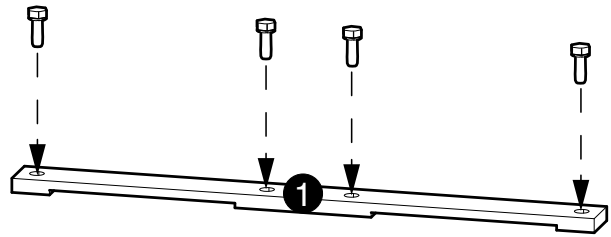


12. Secure the two screws in the lock assembly.
13. Install the lock cover using the provided screw.

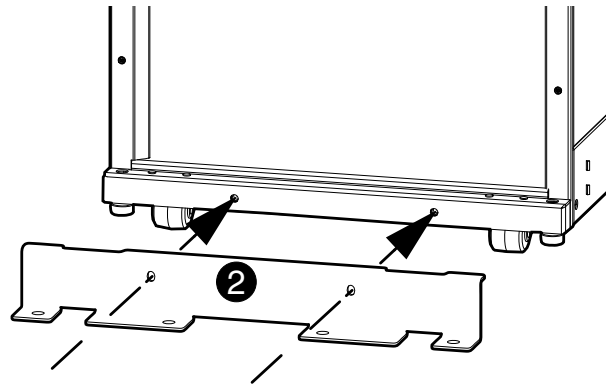


# Install the Rear Anchoring Brackets

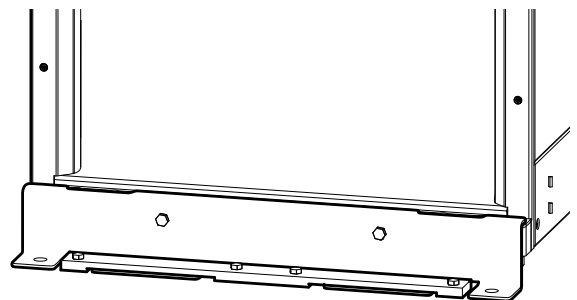
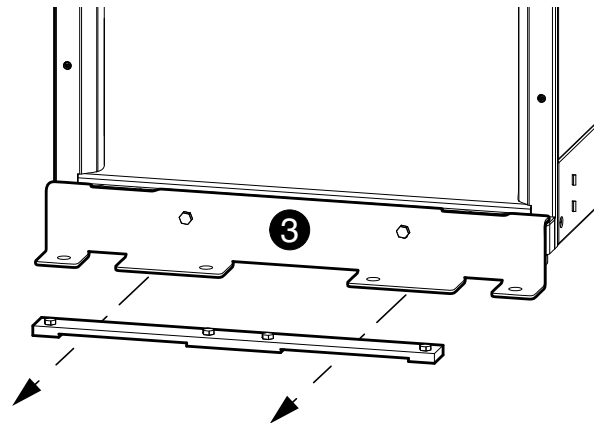
1. Secure the floor anchoring bracket to the floor using floor anchoring bolts (not supplied). Use M12 strength class 8.8 or 1/2 in grade 5 steel bolts.



2. Secure the other part of the rear anchoring to the back of the enclosure.

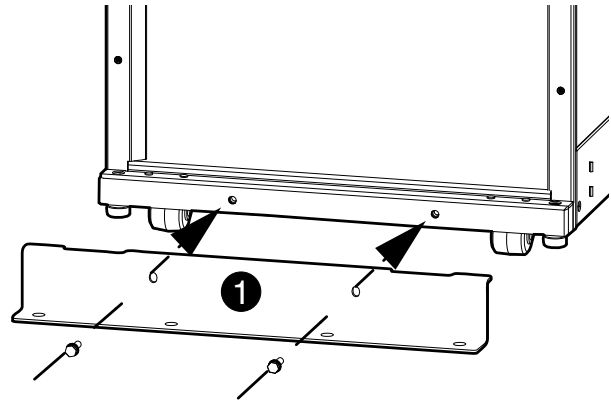


3. Push the enclosure backwards so the enclosure slides under the floor anchoring bracket.

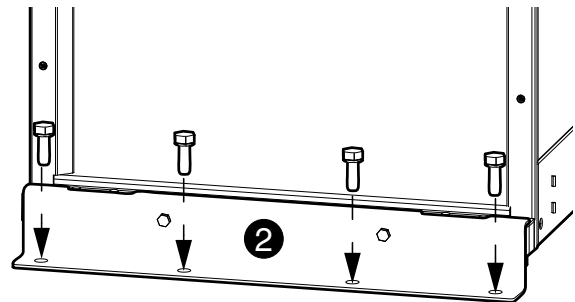


# Install the Front Anchoring Bracket

1. Secure the front anchoring bracket to the enclosure.



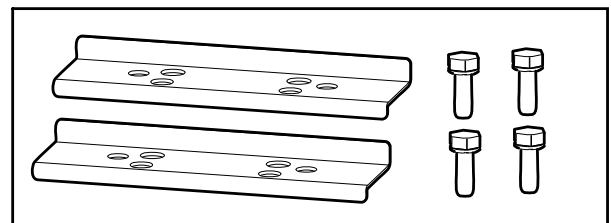
2. Secure the front anchoring bracket to the floor using floor anchoring bolts (not supplied). Use M12 strength class 8.8 or 1/2 in grade 5 steel bolts.



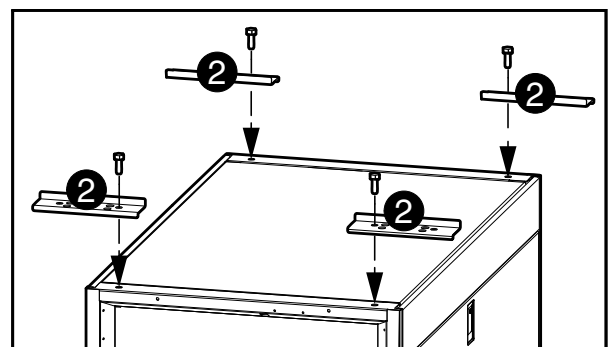
# Install the Top Assembly Bracket

Required parts for each assembly:

- Two top assembly brackets
- Four screws



1. Only applicable for Symmetra PX 100 kW systems: Dispose of the top assembly brackets supplied with the battery enclosure.
2. Place the top assembly bracket over two adjacent enclosures and secure using two screws.



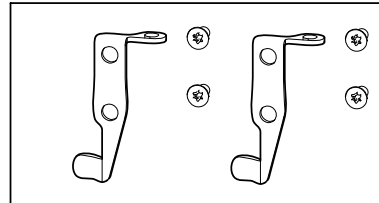
# Install the Door Hinge Lock



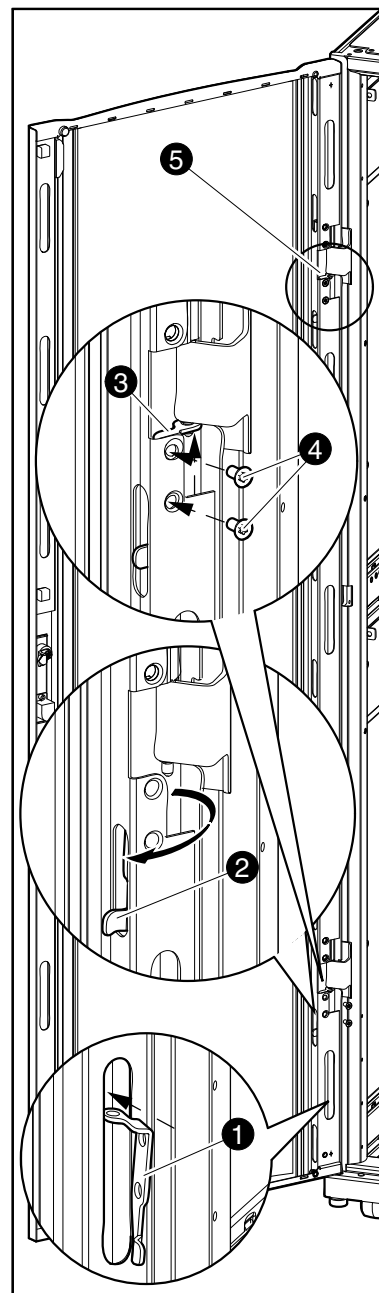
**Note:** This procedure is only applicable for 600 mm and 750 mm wide enclosures.

Required parts:

- Two door hinge locks
- Four screws



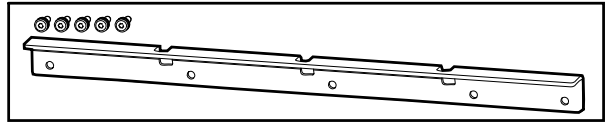
1. With one hand slide the lock into the hole below the hinge.
2. With the other hand turn the lock 90° holding the bottom of the lock.
3. Push the lock upwards to the bottom of the hinge.
4. Secure it with the two provided screws.
5. Use the same procedure to install the upper door hinge lock.



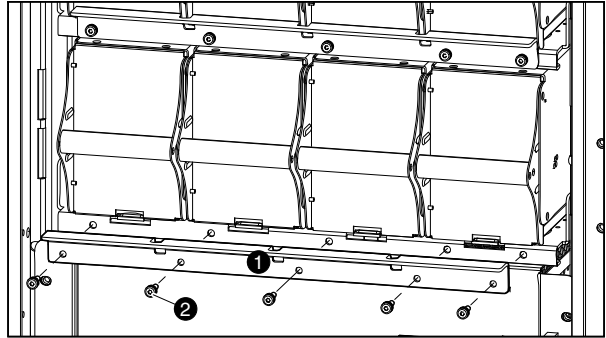
# Install the Battery Locks

Required parts for each battery row:

- Nine battery locks
- 45 screws



1. Place the battery lock below the battery row.
2. Secure the lock by the five provided screws.







## **Worldwide Customer Support**

Customer support for this or any other product is available at no charge:

- Contact the Customer Support Center by telephone or e-mail. For local, country-specific centers: go to [www.apc.com/support/contact](http://www.apc.com/support/contact) for contact information.